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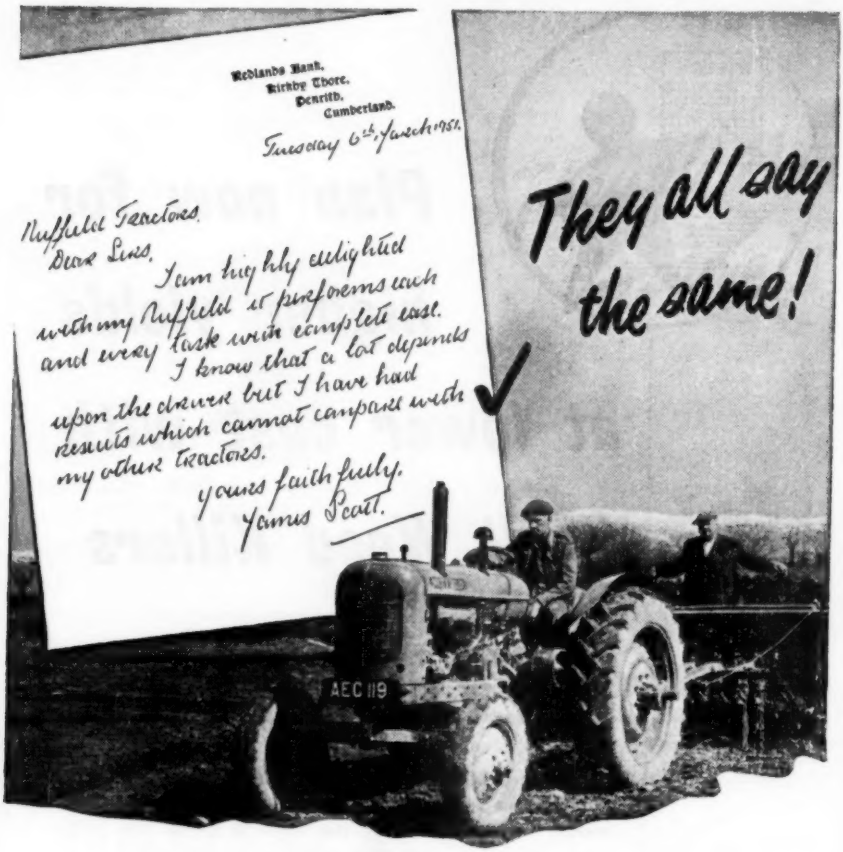

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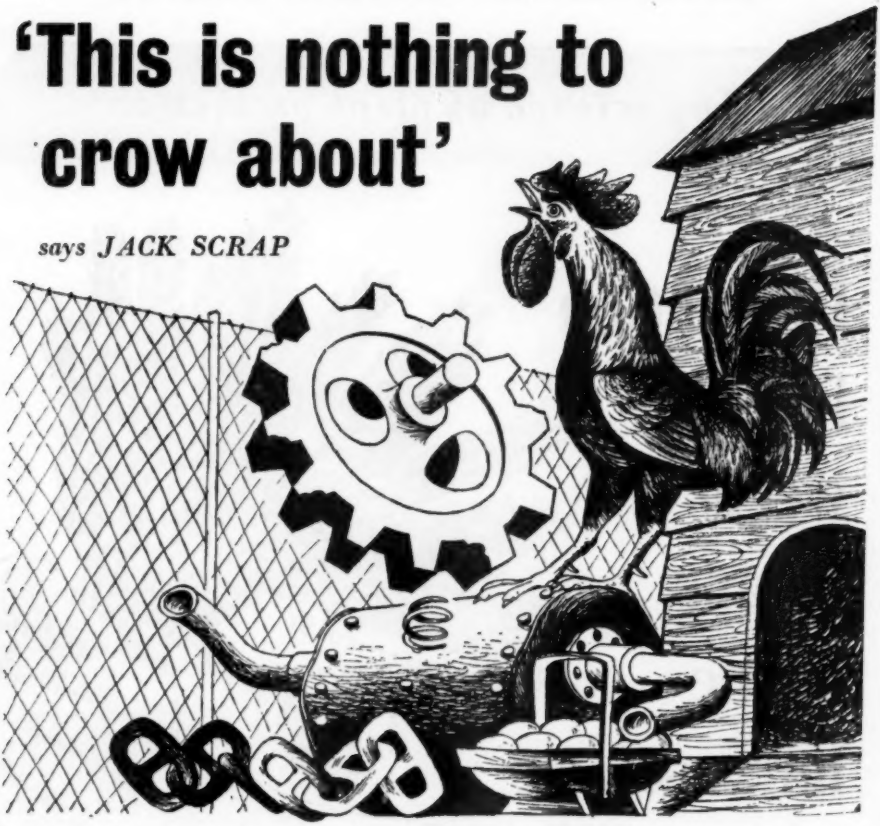

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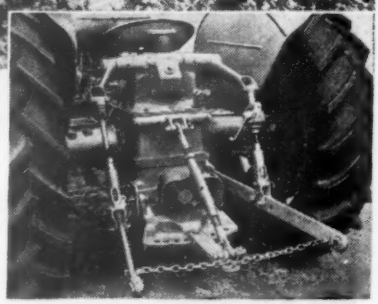

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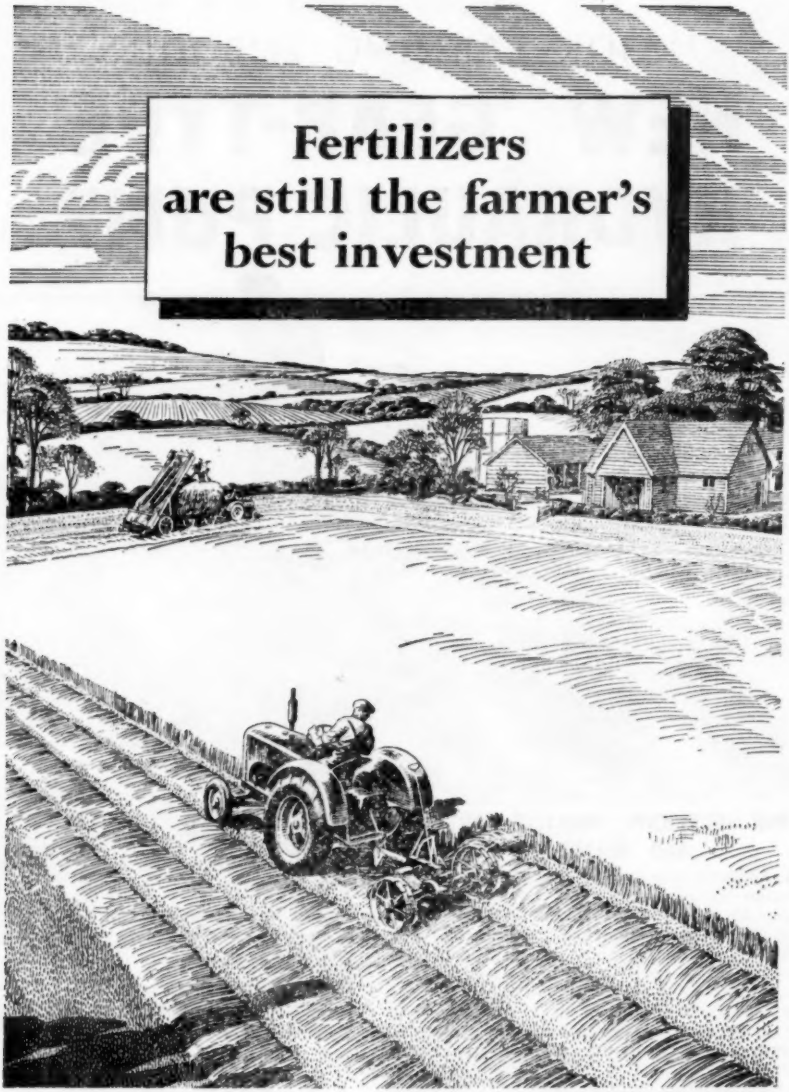

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AGRICULTURE

THE JOURNAL OF THE MINISTRY OF AGRICULTURE

Editorial Offices : St. Andrew's Place, Regent's Park, N.W.1 (*Phone* : *WELbeck* 7711)

VOL. LIX No. 2 MAY 1952

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Cover Photograph

A bunch of pedigree Red Poll cows in Essex

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Message to the Farming Industry from the Minister of Agriculture and Fisheries

Our country needs economic stability. It needs maximum effort and maximum efficiency from all sections of the community.

If we are to be healthy and strong both as a nation and as individuals we must produce more food from our own soil.

I call upon the agricultural industry to respond with energy and enthusiasm to the nation's needs as they always have done in the past.

I could not make this appeal with full confidence were I not completely satisfied that the price award I have just announced provides not only a fair and reasonable financial basis for a renewed and strenuous food production campaign, but a firm foundation for a comprehensive long-term policy.*

After prolonged negotiations, with serious difficulties to be surmounted on both sides, the leaders of the National Farmers' Union are giving me full support.

Farmers will receive all the help and guidance possible from their County Agricultural Executive Committee and from the National Agricultural Advisory Service.

I ask you to show the nation, once again, what British agriculture can do.

Tom. Dugdale.

*The Minister's Statement on the Annual Agricultural Review appears on pp. 89–91.

AGRICULTURE

THE JOURNAL OF THE MINISTRY OF AGRICULTURE

VOL. LIX No. 2 MAY 1952

WORLD HUNGER

C. S. ORWIN, M.A., D.LITT.

STARVATION, or conditions approaching it, have been endemic in the world since history was first recorded. In our own country famines were frequent in medieval times, when the people had to feed themselves without recourse to imports. Right up to the beginning of last century, before the work of the agricultural improvers had filtered through the country to raise the general standard of farming, supplies were often precarious. A bad harvest could leave a whole district short of bread, while in any year a supply of fresh meat during the winter months was a luxury unknown to most people. All the same, the last hundred years has seen no attempt to maintain that balance needed between rural and urban industry if the nation were to keep up some standard of self-sufficiency in food supplies. The reward of the primary producer for his toil is always and everywhere the lowest, and, in Britain, the time came when it seemed better business to turn ploughshares into machine tools, and to trade the products of home manufacture for the products of overseas farming at rates of exchange very profitable to most of the people. Thus fewer than 10 per cent of the population of Britain has come to be engaged in food production, and in Britain is to be found the highest general standard of living of any European country. Taking the world over, however, more than 70 per cent of its people work on the land, most of them at the peasant level and engaged in self-supply.

In many countries population has outgrown the land available for its support, and in those which lack the industrial outlet for surplus labour which has been developed in others, a state of chronic malnutrition has arisen, mitigated partially and temporarily, from time to time, by the devastation wrought by famines, and by pestilences, resulting from under-nourishment and the abject living conditions which it induces. Thus the influenza epidemic of 1918 is estimated to have wiped out the whole population increase of a decade, in India, and as these words are being written more than ten million people in Madras province, occupying the area of 25,000 square miles, are reported to be living in a condition of famine, following the failure of the rains in four consecutive years. These examples may be abnormal, but there are many countries where sub-standard conditions of living are general and malnutrition is endemic.

World Problems In a recent publication, Dr. de Castro, Chairman of the Food and Agriculture Organization, exhibits hunger as a world problem.* The term needs definition, for the old interpretation of

* JOSUÉ DE CASTRO. *Geography of Hunger*. With a Foreword by Lord Boyd Orr. Gollancz. 1952. 18s.

insufficiency of food to satisfy the appetite, resulting in emaciation and sheer starvation, does not cover it today. An individual or a community may enjoy sufficient food to produce the feeling of physical satisfaction while suffering from serious nutritional deficiency, or real hunger. In some of the West Indian islands, Jamaica for example, where the mango grows wild in profusion, the mothers will lay aside their cooking pots in the fruit season, leaving the children to feed themselves on this luscious but completely unbalanced diet. There are forty or more food constituents needed in any dietary to maintain health, as Lord Boyd Orr notes in the foreword to de Castro's book, the lack of any one of which may cause premature death, though not necessarily from the emaciation due to sheer starvation. Using the term "hunger" in this sense, the best pre-war estimates, he says, suggest that from two-thirds of the population of the world up to no less than 85 per cent are technically hungry.

Hunger, then, " can exist as acute starvation, turning its victims into living skeletons, or it can work insidiously to produce chronic deficiencies almost without outward sign," and it is these latter forms, though less spectacular, which are of much greater social significance. Periods of acute starvation arising from drought, floods, the devastation of war, and so forth, must pass in due course, but chronic deficiencies in the make-up of a balanced diet are continuous in action, working from one generation to another with cumulative effects. In China, we are told, some 50 per cent of the mortality is due directly or indirectly to malnutrition, while in New Guinea eight out of every ten children are said to die before reaching adolescence, having been born already wasted by the starvation of their parents, and being unable to recover on the inadequate diet available to them after birth. In these, and in many other countries, malnutrition is a social problem much more acute than famine.

The human body is a type of machine, and if the fuel it uses had only to supply energy, man could live on a single food, on one unvarying fuel, like an internal combustion engine. But the human organism needs more than this ; if alimentation is to be sufficient, it must furnish, also, all the various substances necessary to maintain its equilibrium. " When, quite aside from the question of energy, the diet is lacking or deficient in one or more of the essential chemical elements, the organism suffers partial or specific hunger. Many of these nutritional deficiencies have no external symptoms, although they compromise the health. Others reveal themselves openly as typical diseases—the deficiency diseases." Dr. de Castro reminds us that whereas primitive man had a great number of native plants and animals at his disposal over which he ranged in his search for food, civilized man limits himself to very few. Out of some two million known species of animals, he says that only fifty contribute to our food supply ; similarly, only some 600 of the world's 350,000 vegetable species are cultivated by man. The reduced number of food elements used by civilized groups arises directly from the impossibility of supplying great concentrations of population with a variety of products, thus increasing the liability to chronic shortages of certain essential nutrients. When many different foods are eaten, the specific deficiencies on one day may be made up on the next, but on an unvarying diet deficiencies are consolidated and grow worse with time.

To quote de Castro once more, it has been observed that the Negroes of the Belgian Congo, with a diet based on foods practically unknown outside the area, do not show deficiencies as long as they are living in their native villages. As soon, however, as they go to work in the factories and adopt a diet influenced by their European employers, typical deficiency diseases such

as beri-beri and pellagra, attack and destroy them in large numbers—in fact, he says, the indigenous population of the region has declined by about 50 per cent since European occupation. In the same way, racial customs or prejudices affect nutrition. One of the most serious of specific hungers is protein deficiency. There are both animal and vegetable proteins, and in the perfectly balanced diet half of the proteins would be of animal origin. McCarrison demonstrated conclusively that the superior constitutions and physical development of the Sikhs of Northern India, when contrasted with the Madrassi in the south, are attributable directly to the greater richness of the Sikh diet in animal protein ; they make abundant use of meat, milk and milk products, while the Madrassi confine themselves exclusively to a vegetable diet.

Lord Boyd Orr and Gilks, working in East Africa, made the same observation on the Masai and Kikuyu tribes of Kenya. They live side by side in the same natural environment, but whereas the Masai are graziers, raising cattle and living mainly on meat, milk and ox blood, the Kikuyu are tillers of the soil, living on a diet of cereals, tubers and legumes. The former, therefore, enjoy a diet balanced in proteins, while the latter live in a state of permanent protein hunger, conditions which are reflected markedly in their respective physiques. Protein hunger, says de Castro, is almost universal amongst the inhabitants of those countries lying within the two tropics. The tropical climate is, with certain exceptions, inappropriate to cattle raising, so that some of the Latin Americans, the Negro groups of Equatorial Africa, the inhabitants of India, the Chinese and others, living on a diet predominantly vegetable, are below the average height and weight. The average Chinaman weighs 121 lb. and the average European 139 lb.—a difference due to hunger rather than to race.

Protein hunger not only affects physical development but it reduces organic resistance to disease in general, particularly the infectious diseases. As the quota of proteins in the diet falls, the incidence and virulence of diseases, such as tuberculosis, dysentery and typhoid, rise. The great areas of human destruction due to tuberculosis, for example, coincide with the great areas of hunger, and de Castro suggests that the only effective way to immunize the people against attacks is to feed them properly.

Another way in which people may be specifically hungry is from the lack of certain mineral elements in the dietary ; mineral salts are equally as important as are calories and proteins. A diet otherwise complete, which lacks the proper quantity of calcium or of iron, for example, will seriously upset any living thing which eats it. Most of these minerals are widely distributed in nature and are present in sufficient quantity in almost any human diet ; there are some, more or less rare, however, the absence of which causes dietary disturbancies.

World Challenge Is the world facing calamity within the next few generations, or even sooner, by the failure of food production to keep pace with increasing population ? In his Foreword to de Castro's book, Boyd Orr suggests that the present world population may have increased by anything from 50 to 100 per cent within the lifetime of our own children, and if, as is estimated, some two-thirds or even more of the inhabitants of the world today are hungry, what is going to happen ? There seem to be two opinions. To Malthus, 150 years ago, to Sir William Crookes at the beginning of the present century, and to the neo-Malthusians of today, the outlook of the human race was and continues black : population outgrowing food production ; supplies of vital nitrogenous fertilizers within

sight of exhaustion ; land reclamation to increase the cultivable area slow and nearing its limit ; soil erosion following the use of faulty farming systems still doing irreparable harm to vast areas of productive land ; natural checks to increase of population, such as inter-tribal war, plague, pestilence and famine no longer operative. All of these things have long been speeding up the increase of world population and widening the gap, already too large, between man and his meat.

On the other hand, there is another school of thought to which Boyd Orr and de Castro belong, which does not share these fears. " The first big victory over hunger," writes de Castro, " will consist of a substantial gain in the world's food production. Both nature and science stand ready to co-operate in this. Great tracts of unused land lie waiting to be tilled ; agricultural technology can show us how to make the best of these, as well as how to profit better from the lands now under cultivation, from the seas, and even from the synthesis of inorganic matter. . . . Modern technical advances can improve the yield of lands in use, and can offer new hopes for success in tropical farming everywhere."

He then proceeds to suggest what waits to be done by the extended use of artificial fertilizers, by chemical weed control, and possibly by the vast expansion of cattle raising associated with the use of DDT and other insecticides, in great districts at present unexploited. Modern genetics is producing crops, he says, which can adapt themselves to more extreme conditions of heat and cold, with the result that growth and maturity are possible in climates hitherto unproductive of food. He quotes figures to suggest that an increase of more than 1,000 million acres is an under-estimate of the potential reserves of fertile land which, if intelligently farmed by appropriate technical means, could provide a food supply adequate to the needs of the whole world within ten years, including the estimated population increase during that time.

It is here that de Castro will seem to many to strike a note of undue optimism. Assuming that the figures which he quotes for the potential expansion of farming land and for the intensification of production are approximately correct, what are the chances of realization in practice ? The technical difficulties of land reclamation, the cost of equipment and the mobilization of labour, the cost of fertilizers, machinery and stock for the newly reclaimed lands, above all the trained personnel for the direction of the work and its execution, as de Castro suggests, by 1960, would call for a degree of international concord and co-operation of which, unfortunately, there are no signs in the world today. Recent experiences in East Africa and in Australia, have shown the difficulties of large-scale attempts at the expansion of food production in undeveloped areas. But the lessons of the groundnuts scheme and of the Queensland development scheme have been by no means entirely negative, and Lord Boyd Orr and Dr. de Castro have done well to urge the importance of a united attempt to increase the food supplies of mankind and to raise its standard of nutrition. A book such as this must inevitably be highly controversial and the case for action can only be stated briefly. But there is a challenge here to the general apathy and ignorance of a subject which is of vital importance to the peoples of every country in the world.

MORE MEAT, MILK AND EGGS FROM LESS CONCENTRATES

PROFESSOR M. M. COOPER, B.AGR.(Sc.) N.Z., B.LITT., DIP. RUR. ECON. OXON.

Wye College, University of London

At a recent farmers' meeting at Basingstoke, Hants., arranged by the N.A.A.S., Professor Cooper pointed to a solution of our present feeding problems by the greater use of bulk feed and better grazing in part replacement of the concentrates in the rations of poultry, pigs, sheep and cattle.

IT is abundantly clear that with world food conditions as they are, we have got to produce more from our farm animals and do it with even less concentrates than have been forthcoming during the past few years. The fact that we are still rationed for meat and milk products seven years after the war is not only a reflection of world scarcity but also of the inability of Britain to pay the competitive prices to stimulate exports from countries such as the Argentine and Australia. Only the other week, an Australian Minister was complaining that the prices that we were offering were below the cost of production. Any hopes we have of getting meat from Australia are very dismal for, with her expanding population, more meat and dairy products will be required for consumption there. British farming has now a greater responsibility than it has had since the days before refrigeration, and our material standard of living is highly dependent on what we are able to produce from our limited acres. Unfortunately, too, the animal feeding-stuffs that we used to import for conversion into meat, eggs and milk are no longer available. The cold, hard facts are that most of the world's coarse grain is either behind the dollar curtain or the Iron Curtain. Though we may be able, by barter arrangements, to get a certain amount of coarse grain from Russia, strategically it would not be a very satisfactory basis on which to build an animal industry.

There are two schools of thought regarding home production of animal feedingstuffs. One school believes that we should use the plough to grow the concentrates which we can no longer buy : the other considers that we should make greater use of bulks. Because of my New Zealand up-bringing I should belong to the bulk school, for in that country the few people who feed concentrates to dairy cows make their money not from selling milk but from selling bulls at disproportionately high prices. The commercial dairy and meat industries which supply us with most of our butter, cheese and lamb are based on grass and, to a limited extent, on forage crops. One cannot, however, transfer a completely New Zealand style of agriculture to Britain. A primary difficulty is the small size of our farms, for it is so much easier to have self-sufficiency based on bulk foods when farming units are reasonably large. A second factor is our need to maintain a fairly even level of production over the year ; and this is not easy when you are working with a five months' winter. It is this realization which gives me a certain amount of doubt as to which school of thought I belong, but you will see from my account of what we are doing at Wye that my colleagues and I are trying to resolve my doubts.

Eggs First, let us consider the production of eggs. If we are going to preserve a bacon and egg breakfast in this country, even a token one, we will have to do that from our limited British store of concentrates because the hen cannot make use of bulk foods to any great degree. Much

of the extra food we will need for poultry may have to come through a reduction in the amount of concentrates that go to horned stock. At the same time we must make the most of our feeds by improved management and better breeding.

At Wye we have a progeny test under free range and battery conditions. Taking the output up to an average age of 500 days, production from the same class of birds averages 130 eggs with free range and 170 with the battery flock which has had extra lighting. These figures are based on the number of birds drafted into the trial before point of lay, and are true averages of production. We are getting at least three dozen more eggs from the battery birds during the high-price winter period. Although for other purposes of the trial we do not practise culling, we know with the battery system exactly which are the passengers that would normally be culled, and, if this knowledge were applied, the efficiency of production would be further improved. I admit that the capital outlay on batteries is considerable, but in our problem the saving of foodstuffs may be more important than the cost of bricks and wire cages.

Turning now to breeding, it is remarkable how quickly one can get improvement in a flock if proper methods of selection, such as that used by Lerner in California, are adopted (1). By progeny testing and sister selection, he took his White Leghorn flock from a 140 average up to 220 within twelve years. We shall have to use such methods of selection rather than four finger exercises under the tail if we are to preserve our poultry industry.

Bacon Turning now to the bacon pig, there is much we can do with fewer concentrates. I am rather proud of the fact that we at Wye were the first in Britain to do any work with fodder beet for pigs. In 1947 we had some trial plots of the variety Hunsballe, which has a 20 per cent dry matter content. Our pilot trial was so successful that since then we have extended our studies, and now have a lot of confidence in fodder beet. Starting off with pigs of about 65 lb. live weight, feeding them on a basal meal ration of 3 lb. a day and satisfying their appetite beyond this with fodder beet, we can get them to carcass weights just as fast as all-meal-fed pigs. As a result, the consumption of barley meal is reduced by about 45 per cent. There is 15 per cent of fishmeal, or its equivalent, in the basal meal ration, for fodder beet is very low in protein. If you limit intake of meal to 3 lb., then it must have an adequate protein content. Currently we have a trial in which we are feeding 3 lb. of basal containing 10 per cent of fishmeal, but we are also feeding 1 lb. of good quality dried grass. This trial is about three parts through, and the experimental pigs are growing just as well as the controls which are on all-meal feeding.

During the past year we have considered another aspect of bulk feeding, namely, the use of a high dried grassmeal containing about 20 per cent of crude protein. There were three levels of feeding, with grass forming 2, 15 and 30 per cent of the ration, and comparable groups of pigs kept together from 100 lb. to 220 lb. live weight. If we can cut down the cost of high quality dried grass we may have another valuable source of feed for our pigs.

Milk Coming now to dairy cows, which are closer to my heart than pigs and hens, over the past four years we have been trying hard to get more milk from less concentrates. At the present time our herd contains 53 cows, over half of which are first or second calvers. In January they were producing 155–160 gallons of milk daily—that is, an average of about 3 gallons per cow. Concentrate feeding per gallon works out at 1½ lb., for

only 200 lb. of concentrates go into the dairy each day in the middle of winter. This compares with at least 3 lb. per gallon, which is the national average over the whole year. In fact, there are some dairy farmers who are using as much as 5 lb. of concentrates for every gallon of milk produced in the year. We could not get this level of production, however, if we were not feeding really high quality bulks such as leafy silage made from leys and tripod hay. In order to get a more precise picture of the value of these bulks we are at present engaged on a series of feeding trials.

Last winter we used Ayrshire heifers, with an initial average production of 3 gallons per day, in a double reversal trial. One group was fed concentrates (home-grown oats and beans) at the rate of 4 lb. for every gallon of milk produced over maintenance and half a gallon, the basic ration being provided by hay, mangolds, and grass silage of medium quality. The other group were on the same silage but, instead of mangolds, had fodder beet, which has about twice the feeding value of mangolds. In addition, they had dried grass with a crude protein content of 14 per cent. The difference in production in favour of the concentrate group was only 2½ lb. of milk daily over the period. When one translates the story back into terms of production per acre we get a very different picture, and it is production per acre and not production per cow which really matters in this battle for food.

This year we are doing a similar experiment using cows which, at the beginning of the trial period, were giving just under 4 gallons per day, after having been in milk for two months. In one treatment we are feeding 3 lb. of concentrates (5 parts beans ; 3 parts oats ; 1 beet pulp ; 1 flaked maize) for every gallon of milk ; another group receives only 1½ lb. of concentrates to the gallon, and a third has no concentrates. Hay, silage and fodder beet are fed to all cows. The trial has not been going long enough to give any definite results, but one of the most surprising features so far is that there is no difference between the two levels of concentrate feeding. I put this down to the quality of the bulks, which are concentrate-savers. The hay, which was made on tripods, has an analysis of 12 per cent crude protein, while the silage contains 16.5 per cent crude protein. The other bulk feed, fodder beet, has 20 per cent dry matter. Production of the non-concentrate group has fallen a third of a gallon a day per cow, but as this ration involves a saving of 6 lb. of corn, worth at present prices at least 1s. 9d., the extra milk appears to be very expensive.

Outside the winter period our main effort is the extension of the grazing season, which is now effective for nine months in the year. Generally, the first grazing comes either from wheat or from rye. We find that with wheat we are dropping our yields of grain by 2 cwt. to the acre through grazing in the early spring before the growing point is above the ground, even though we apply 1½ cwt. sulphate of ammonia immediately after. But we are getting about 4–5 cwt. of dry matter, containing 20 per cent crude protein, from the grazing by way of compensation. Short-rotation ryegrass, or H.1, is, to my mind one of the most valuable grasses that have been introduced into British agriculture in the past few years. It has the same capacity as Italian ryegrass for out-of-season growth and is persistent, provided the fertility is maintained. With us, it gives good grazing in the latter half of March and carries on till May. It is not a good summer grass, but it comes again in autumn and grows when other species are dormant. In our district, lucerne mixtures are very important, especially for the summer gap.

The electric fence is indispensable to efficient utilization, and Jealotts Hill work shows a difference of around 20 per cent more grazing between ordinary rotational grazing and strip grazing with the electric fence. This means that

potentially we can add 2 or 3 million acres to the grassland of this country, provided there is a widespread adoption of fold grazing. Certainly, it has made a very big difference to our production and carrying capacity since we have adopted this method. I must add that strip grazing is not as straightforward as some people may have you think. A difficulty we are encountering with the second folding in the spring is that there is a big residue of ungrazed grass because of fouling during the previous grazing. We are trying to alternate mowing for silage and grazing as much as we possibly can to improve utilization. Another feature of our management is the strip grazing of what we call " cool-store " grass. Fields which are eaten out in August are given a top dressing of about 1 cwt. nitrogen, and are reserved for October-December use, carefully rationed behind the electric fence. We were able to provide one-third of the daily food requirements of the herd from the pasture until the shortest day, and the cows produced well. Perhaps it is not as good as spring grass, but it produced a lot of cheap milk.

Mutton and Beef Now let us turn from dairy cows to the problem of more mutton and beef. The sheep and the bullock are the least efficient animals we have in terms of conversion of their food into human food. We can only justify the use of concentrates with them at certain critical times, for instance at the early rearing stage with calves and to breeding ewes as they approach lambing. At other times it must be grass and cheap derivatives from grass. There is some very interesting work going on in both Northern Ireland and Scotland on the use of silage for fattening bullocks. At the North of Scotland College of Agriculture [2] really first-class bullocks are being fattened on a diet of silage, and rates of gain compare well with traditional methods of feeding. The Northern Ireland results, which Professor Morrison has published[3], are comparable. Previously, I mentioned the feeding of concentrates to ewes. In the last month or six weeks before lambing, the pregnant ewe has a high demand for nutrients, and if she is denied them she will start to live on her condition, with the consequent very real danger of pregnancy toxaemia. Wallace and Hammond at Cambridge [4] have done some interesting work on the plane of nutrition at this stage. The lambs from their well-fed ewes were much bigger and stronger than those from poorly-fed ewes and consequently had a better chance of survival. Furthermore, the ewes were " steamed up " and gave more milk than their mates, which were poorly fed over the last third of pregnancy. Our breeding ewes, which will lamb in March, are given a small amount of corn from the beginning of February, starting at ¼ lb. daily and rising to about ¾ lb. at lambing. The balance of their food is provided by hay, a small amount of mangolds and such grazing as they get. The 160 hoggets we are wintering are getting no concentrates at all. There is one point upon which I am certain, however, and that is if you are going to winter lambs successfully on grass you must keep them moving, or else spread them very thinly on clean ground. Over the winter period we concentrate our hoggets on the cow pastures for short periods of not more than ten days. By doing this we are keeping them thrifty, for they go on to clean food and the risk of worm infestation is reduced. If there is any feed left in these fields then the ewes with an age tolerance to worm infestation are used to eat it out.

Calves and Concentrates One last aspect I want to deal with is the use of concentrates in the rearing of calves. We do not now feed concentrates to the weaned calves once they are able to go out on to grass. Last year all our Ayrshire calves which were over three months

old went out on to pasture at the beginning of May and were fed some hay for the first week. Thereafter, they were never kept in one field for more than eight or nine days and they were always moved to good clean pasture—not long and lush but clean, short growth such as one provides for sheep. From May 1 to November 1 these calves, on grass alone, gained at the rate of 1½ lb. live weight per day, and now at 15 months they each weigh between 5½ and 6 cwt. They are being wintered on silage and hay with no concentrates at all, and they are big enough for bulling. These heifers have not had more than 1½ cwt. of corn in their life but no one can cavil at their growth.

Confidence in our Grass I have tried to open up some aspects of a problem which will confront every farmer in the years that lie ahead. The demand on British agriculture is an impelling one, and if we are not going to accept rationing in perpetuity we have got to produce more. We can produce at least 20 per cent more cereals, and there are no technical reasons to prevent a 50 per cent increase in animal production from pasture. Unfortunately, there are not enough farmers who are giving grass a chance to show its real worth. The characteristic outlook on grass was summarized by one of my students who went out to New Zealand about three years ago. He wrote back to me : " The grass here is no better than that of our good English pastures, and yet farmers are able to get really high production from it without using cake. The trouble is that we have insufficient confidence in our grass." This student was quite right, for if we relied more on pasture we might learn something of its virtues and we would produce very much more milk and meat and use very much less corn in doing so.

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For the Laboratory

The publication of a new monthly periodical entitled *Laboratory Practice* will be of interest to research workers, advisory officers, teachers and others. Its aim is to facilitate the interchange of ideas and experience in those fields particularly concerned with laboratory design, equipment and organization, laboratory techniques, quality and process control, and laboratory instruction, libraries and information services.

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THE DAIRY FARMER AND THE COST OF MILK PRODUCTION

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Rising costs demand a close examination of the economics of dairy farming if their effect is to be combated successfully. The writers suggest some of the steps farmers may take to establish and maintain a system of milk production that is both profitable and efficient.

FACED with rising prices, labour difficulties and the competing claims of other farm enterprises, there is little doubt that the position of a number of dairy farmers is more difficult now* than it was a year ago. What, then, can the milk producer do to ease the situation? A few will decide to drop milk production altogether and try to use their land, labour and capital for some other purpose in the hope of earning a better living. Such a decision must, however, be of a long-term nature and will affect the whole pattern of their farming for many years to come. Farmers contemplating such a step would do well to remember that, over a long period of years, returns from dairy farming have been relatively consistent. During the war, dairy farm profits did not attain the high levels reached on some types of farms, but before the war many farmers were glad to receive the regular monthly milk cheque.

The probability is that relatively few farmers will abandon milk production in favour of some other enterprise, and this article is addressed to the farmer who has decided to devote the bulk (80–90 per cent) of his farm resources to dairying. What can he do to counter the steady upward trend of the costs of his raw materials?

The answer is that he can do one or all of the following things: (1) modify his system; (2) improve his efficiency; or (3) increase the volume of his business.

It will be appreciated, of course, that many farmers will be unable to improve their operating efficiency without first modifying their system of production or enlarging the size of their business.

Modifying the System Studies of costs and returns from milk production which have been carried on in Britain for many years show it does not cost any more to produce quality milk from tested cows. Higher expenditure is incurred, but this is counterbalanced by improved yields and lower herd replacement costs. Consequently, the farmers concerned benefit from the premiums they receive for their milk. The capital cost of replacing reactors in the herd and of adapting buildings to suit the requirements of T.T. milk production is considerable, but in recent years the higher earnings of T.T. producers have provided a good return for their investment.

Cost studies have also shown that successful farmers generally produce the greater proportion of their milk between October and March. There is a good deal of evidence† to show that level or winter producers make more

* Mid-February, 1952.

† *Milk Production Costs in South-West Scotland*, 1945-46 *to* 1947-48, 1948-49 *and* 1949-50, The West of Scotland College of Agriculture's Economics Department Reports, No. 6, 1949; No. 1, 1950; No. 3, 1951.

money than seasonal or summer producers. But more skill and better management are required for winter than for summer production. There is firstly the job of ensuring that the cows calve down at the right time. Then there is the need to harvest enough high-quality feed for the cows to eat. Cows milking in winter require more and better quality food and greater care and attention than summer-milking cows. Yet, although he may incur more expense per cow, the level producer generally gets a better return per cow.

During 1950–51 the upward trend of summer prices was greater than that of winter prices, but this trend has been reversed in 1951–52. The increase in milk prices between April and September 1950 averaged 1.08d. per gallon, against the 0.85d. per gallon average for the period October 1950 to March 1951. But the April to September 1951 average increase in price was only 1.13d. per gallon, as against 1.54d. per gallon average for the six winter months October 1951 to March 1952. It would seem, therefore, that despite the higher cost of feed, labour and fertilizers, the winter producer will still retain an advantage over the summer producer because of the greater returns per gallon he obtains.

Improving Efficiency Of the many factors influencing the efficiency of dairy farming, yield per cow is probably the greatest. National figures for 1949–50 show that the herds with the highest yields realized more than eight times as much profit per cow as the herds with the lowest yields. Gross costs increased, but not in the same ratio as yields, and as yields increased, so the costs per gallon fell and profits per cow steadily rose (Fig. 1).

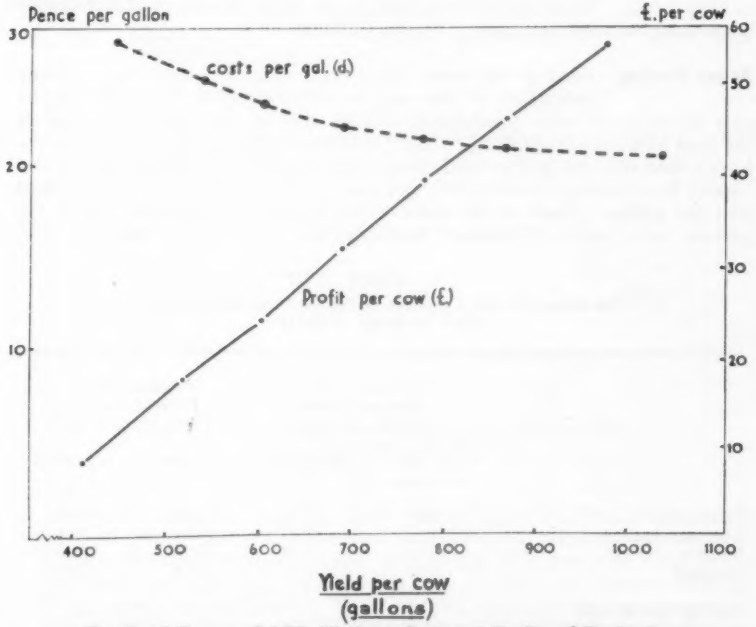


Fig. 1. Influence of Milk Yield on Costs and Profits of Production
(National Figures, 1949-50)

THE DAIRY FARMER AND THE COST OF MILK PRODUCTION

Not all farms and conditions are suitable for the attainment of high yields but where high yields were obtained they paid well. On large farms, or on farms where dairying is not a major enterprise, it may pay better to aim at more cows per man rather than at more milk per cow. But 75 per cent of the dairy herds in the country have less than 20 cows, and on the small intensive farm where personal supervision and individual attention to cows is possible, increasing yields is a surer way of improving or maintaining profits than keeping more cows.

There are three ways of getting higher yields—harder culling, better breeding, and better feeding.

Harder Culling Far too many herds are carrying passengers. It costs about £50 a year to keep each of these poor cows. Yet, how often do we hear the farmer making excuses for some of his cows. One " might do better next time if she has a long rest " ; another " won't stand to the bull but she gives a lot of milk when she does calve " ; still another " will make more money as a down-calver than if we sell her now". Many farmers fail to realize that the only way to cut their loss is to sell out a poor cow and buy in a better one. The feed and labour saved will usually offset any capital depreciation incurred. Every farmer must aim at the best herd average yield, not at high individual yields. The modern dairy farmer cannot afford to be without the milk and breeding records which form so useful a basis for weeding out his poor producers.

Better Breeding This is obviously a long-term approach, but on many small farms it will be cheaper to use artificial insemination than to keep a bull. In dairying, more than in any other branches of farming, it is necessary to look and plan a long way ahead.

Better Feeding Feed is the most important item of direct costs. Some indication of this can be obtained from the results of a cost analysis of milk production carried out on a number of farms in the East Midlands in 1950–51, when it was found that the ten herds with the lowest feed cost per gallon made three times as much profit per gallon and almost four times as much profit per cow as the ten with the highest feed cost per gallon. Each of the cows of the first group produced about 150 gallons more milk at a lower feed cost both per gallon *and per cow.*

Table 1

The Effect of Feed Costs per Gallon on Costs and Returns
(*East Midlands*, 1950-51)

	10 Herds with Highest Food Cost per Gallon		10 Herds with Lowest Food Cost per Gallon	
	per cow	per gallon	per cow	per gallon
	£	*d.*	£	*d.*
Feed costs	50.9	21.20	32.8	10.93
Total net farm costs	72.2	30.07	60.4	20.12
Returns	84.4	35.15	106.3	35.4
Margins	12.2	5.08	45.9	15.28
Average size of herd	24.5		38.5	
Yield per cow (*gallons*)	576		720	

Doubtless, some of the bigger profit margin of the low feed cost group can be ascribed to the larger size of herd and to the higher milk yield, but the difference of 10d. in cost per gallon was due largely (if not almost entirely) to the lower cost of food per gallon.

Examining the quantity and the production cost of the feed given to both these groups, it was found that the high-cost farms provided more of all kinds of feedingstuffs (except silage), despite the fact that their yields were much lower. The greatest difference between the groups was not so much on concentrates but in the feeding of roughages. The high-cost farms gave their cows a lot more roughages and succulents *and* still gave them more concentrates than the low-cost farms. Although the differences in costs of production are not negligible, it is clear that on many farms far more can be achieved by economy in the utilization of particular types of feed than by economy in feed production.

Some idea of the extent of overfeeding on the high-cost farms can be obtained by comparing the amount of food theoretically required with the amount actually fed (Fig. 2).

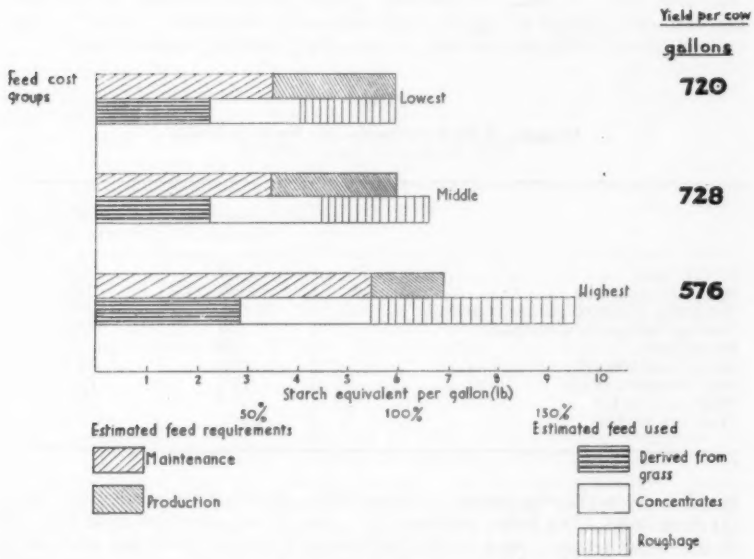


Fig. 2. Comparison of Feed Required and Used per Gallon
(East Midlands, 1950-51)

For this comparison it has been assumed that the low feed-cost group were fed exactly the required amount of hand-fed foods—the balance of their requirements coming from grass. It also has been assumed that the high feed-cost herds derived the same amount of starch equivalent from grass as the low feed-cost herds. These figures, although of a rather arbitrary nature, suggest that the high feed-cost farms were overfeeding. The exact extent of this overfeeding depends on the contribution actually made by

grass. It may well be that the grassland on the high cost farms was less productive than that on the low cost farms, but it is extremely unlikely that the productivity of their grassland was so low as to justify such heavy supplies of hand-fed foods. It is much more likely that the low cost farms were feeding home-grown foods with a much higher content of nutrients and that this enabled them to save concentrates.

Volume of Business Strict culling, better breeding and better feeding are sound maxims whatever the size of the herd. But when the margin between costs and returns is narrowing, it is worth emphasizing that volume of business is one of the most important factors governing the success of a dairy farm. The man who produces the greatest *gallonage* of milk from the land, labour and capital at his disposal is the one with the best chance of making the highest profits from his herd. Every farmer must decide for himself how much emphasis to place on numbers and how much on yields.

The records of the dairy herds costed in the East Midlands in 1950–51 illustrate how the volume or size of the farm business can vary on the same area and class of land. When forty predominately dairying farms were placed in two groups of high and low total milk production, in such a way as to eliminate differences in size of farm, the following figures emerged :

Table 2

Influence of High Production per Farm on Profits
(East Midland Province, 1950-51)

	High Production Group	Low Production Group
No. of farms	20	20
Size of farms (*acres*)	116	114
Total milk produced per herd (*gallons*)	22,095	16,678
Average yield per cow (*gallons*)	734	668
Size of herd	30	25
Returns per cow (£)	109.	97.3
Net costs per cow (£)	72.6	71.7
Profit per cow (£)	36.4	25.6
Profit per herd (£)	1,096.	639.8

It will be seen that the group of farms with a greater total production had : (1) more cows, (2) a better yield per cow, and (3) the same net costs per cow as the other group. As a result, they made a greater profit per cow and a greater total profit. Moreover, they achieved it by producing more food from their land at a lower cost and by feeding it more efficiently than the other group.

Making the Best Use of the Land Not only do the more efficient farmers feed their cows better but they also make better use of their land by growing cheaper crops and more of them. Of all the crops grown on the farm, grass is by far the cheapest, as Table 3 shows.

Extension of the grazing season to provide both an early and a late bite should save expensive home-grown foods, whilst controlled grazing allows the maximum utilization of the grass.

Table 3

Cost of Starch Equivalent from Grazing and Some Other Foods
(East Midlands, 1949-50)

Source of Starch Equivalent	Cost of One Ton of S.E.	Yield per Acre of S.E.
	£	*cwt.*
Purchased compound cakes and meals	41	—
Sugar beet pulp	25	—
Home-grown oats	21	11
Kale	22	31
Sugar beet tops	21	17
Grass silage	20	11
Hay	16	11
Grazing	6	9–10*

* Estimated figure taken from "Some Economic Aspects of Grass Production and Conservation." G. H. N. PETTITT and J. CLARK. I.C.I. Agricultural Development Department. *Bulletin No. 1.*

Although grassland and grassland products are the cheapest source of food, it may be necessary in certain circumstances to look elsewhere for starch equivalent. Where the acreage of land available for the dairy enterprise is limited, the need to provide sufficient food to maintain a certain head of stock, and hence a certain farm income, may outweigh the importance of grassland. If a farmer wishes to maintain a certain number of cows on a given acreage, it will pay him to retain only sufficient grazing land to keep the cows in summer and turn the rest over to arable crops, which, although a dearer source of starch equivalent than grassland products, makes better use of the land by giving a greater yield of fodder per acre. In such cases it will be necessary to buy in food but, if increased milk yields can be obtained by the use of purchased concentrates, it will pay to feed them so long as the increased profit thus obtained is more than the cost of the concentrates used to obtain that yield. At present prices of dairy cake, and feeding at 4 lb. to the gallon, the price of milk could fall to less than 1s. 2d. per gallon before cake feeding became uneconomic. Stated another way, it means that even in the months when milk prices are lowest, cake prices would have to rise to £50 per ton before cake feeding became unprofitable.

Farm Organization Finally, costs can be kept down by close attention to the use of labour in dairying. Each farm has its own labour problems, and no general panacea can be recommended. Each farmer should study his own organization to see where he can make better use of labour under his particular conditions. In some cases milking, feeding or other routines could be altered to advantage ; many farm buildings are wasteful of labour but are often capable of slight modifications which will result in a saving. Whatever is done in this respect, however, it should be remembered that, although labour saving is important, it should not be achieved at the expense of yields or feeding efficiency, since these two have a far greater effect on costs and returns.

GETTING THE WORK DONE

Being some reflections of W. B. Mercer, C.B.E., B.Sc., Chairman of the Oxford Conference, 1952

AS time is reckoned in agricultural history, labour planning is a new development. There cannot have been much room for practising the arts of management through all the weary centuries when spring corn succeeded fallow and wheat in the changeless rhythm of the open field. When farms were enclosed, opportunity for the organization of routine arose and some beginnings were doubtless made, but the pace was slow, for agricultural labour was cheap, even as its products were usually cheap. Relatively, machinery was much dearer. Early efforts seem indeed to have been more concerned with discipline than with increase in the power of the individual worker, and certainly they were carried out with small regard for the likes and dislikes of the subjects. Thus the routine of the cowsheds, with its insistence on silence at milking time, probably stimulated the proprietor's sense of fitness more than the cows' milk. It is difficult to believe that the great Barclay of Ury, who cut down the hoe handles of any turnip thinners observed to straighten up, really got much more work done as a result. Until quite recent times there was in the countryside a placid and unquestioning acceptance of things as they were. " The rich man in his castle, the poor man at his gate," were as much part of the established order as seed time and harvest. If any doubts arose in anybody's mind about the inevitability of this order, were they not quelled by the assurance that " God made them high or lowly and ordered their estate " ?

There was nothing in the nature of antagonism between the farmer who employed and the man who was employed. On the contrary, there was a very deep sense of unity. The farm team has never been either large or uniform ; it has always contained men with some personal stake in the soil. The staff has never been " personnel " but has always consisted of " old George and young Tom." Community life has been strong in the villages ; the church, the pub, the school, the cricket ground, all helped ; and if the politics of the parish pump descended at times to the banal, they had at least the merit of arousing general interest. But the greatest common bond was the soil itself. Respect for good farming was universal. In a sense everybody took some pride in the farming of his parish whether he had any direct share in it or not, and, equally, poor farming cast a sort of penumbra around the farm where it was displayed. There were no great extremes of wealth in the ranks of farmers and workers, for, with the exception of brief spells, farming has rarely paid big dividends, and for a century at least there has been no abject poverty in the countryside. Social distinctions, however, as rigid and adamant as those of the " hall " (probably arising from those of the hall) lived on down to our own time. Workmen living in the farmhouse rarely fed at the same table as the family—a relic perhaps of medieval dining below the salt.

The change that has come upon us in recent times is but a facet of the development of public opinion throughout the country. It is in part, no doubt, a crude reaction to economic forces—when labour is dear it pays to look after your men, just as it pays to keep an expensive tractor in good condition. But it would be mere cynicism to stress this aspect ; in the main it is a spiritual development from the torment and fierce turmoil of war, a broadening of human sympathy. It affords the answer of our age to the primordial cry, " Am I my brother's keeper ? "

Wages and Bonuses That men must be adequately paid for their labour stands to reason. In equity it would seem obvious that the pay ought to be proportionate to the skill displayed and the value of the work done. Large numbers of schemes for bonuses on results achieved or assessed have been worked out in different systems of farming and are in operation today. Opinions on their effectiveness and fairness, however, vary markedly. Nearly all are effective at first, especially while production justifies increasing rewards ; a fall in the amount of the bonus, though justifiable by the logic of arithmetic, is liable to create a sense of penalization. Moreover, farm teams maintain a strong sense of unity. Differential payments are apt to be regarded as unfair to those who receive the lower wage. Crude as it was, the old system of lump payments equally divided at the end of a harvest or a season had much to commend it. Certainly, bonuses are not the complete answer to the problem of contented and efficient staffs. The roots of the matter lie much deeper.

Mostly men tend to keep their thoughts on human relationships to themselves, lest they be accused of cant ; but today that reticence is breaking down, though even now it is difficult for a man to talk about principles of labour control and the reactions of workers when everybody knows he employs but two men. This makes his observations rather personal. Moreover, discussion is still limited by the fact that every man in discussing labour is in some degree exposing his own flank.

Control There is some truth in the saying that farmers get and keep the staff they deserve, though probably the best of employers would be hard put to it to say why they get and retain good men. It is not easy for an observer to discern the rules, and men of affairs are not usually introspective or communicative. But something can be learned from observation of the practices of good employers. Assuredly, success does not spring from easy-going ways ; quite often it seems consistent with the very reverse. Stability and justice seem to be the prime governing factors. " A beast, but a just beast " may well, like Arnold, command respect and loyalty when an erratic philanthropist may only earn contempt. The cry for a consistent policy so clamantly demanded by farmers finds an echo amongst the staff on the individual farm. Men do not like being " chivvied " about (there are other words in use on the farm). On the other hand, they respond within their powers to responsibility : and a first principle of management consists in appointing to each an adequate task and leaving him to do it ; when changes are to be made, they need to be studied carefully before they are made, their repercussions foreseen. The great strength of good organizers lies in their capacity to combine control with delegation of responsibility. Quite often this involves acceptance of standards below those which the employer would adopt were he doing the work himself. Taking a long view, it may be advisable to tolerate something short of the best if that something represents the best the employee can do. This state of affairs is indeed common in dairy farming. Many owners of big commercial herds fail to practise accurate rationing, not because they do not know or do not believe in the rules, but simply because it is easier to get a rough and ready but less accurate system carried out.

New Methods The moral is inescapable. Since many of the executive decisions upon which farming depends are in reality made by employees, the need for technical knowledge in the employee is of almost as much consequence as it is in the employer. Clearly there is an immense field of work for educational bodies in the design and conduct of instructional

courses suited to the needs of farm workers, alike in respect of manual and managerial tasks. Much propaganda and probably much study of the content of such courses will be needed. Present efforts in this direction meet with a good deal of apathy, and that not only—perhaps not chiefly—from employers called upon to release men for training. An important part of an employer's function is to persuade men to new ways. The very virtues of the worker—patience, persistence, doggedness—are apt to hinder innovation. Their reactions to routine vary greatly. All children and youths are depressed in spirit by the sight of long rows to hoe, and even adults prefer as a rule some system of breaking work up into stints. It has been noted that Scottish gangs of potato pickers work most contentedly on the moving chain system, partly because each bout of the machine gives them a definite quota of picking, partly because of the momentary halts it allows for gossip. (The principle is not of course peculiar to farming ; students of industrial psychology have observed that women set to sort dried fruits get through more in a day if they are presented to them in half a dozen little piles instead of in one big pile.)

Change, irrespective of the nature of the work, appeals perhaps to the majority and some employers are at great pains to organize work in such a way as to avoid keeping a man perpetually at one job. But there does not seem to be any absolute rule about the matter. Exponents of the belt system in industry aver that women generally prefer absolute uniformity ; presumably because, better than men, they have learned to sever body and soul, to labour automatically with their hands while allowing their minds to soar into the empyrean.

Attractive home conditions are of great moment in preserving a healthy tone in farm staffs. Some employers go so far as to say that cottages are of more consequence than wages. Certainly no man is likely to work well if at the end of his day's "darg" he is forever met with a dirge about the condition of the house. Difficult as the housing situation undoubtedly is, farmers have, through service on rural district councils, an opportunity of exercising some influence on the pace and manner of development.

Leadership Without doubt, leadership in farm work evokes a just return. It cannot in the nature of things fall to every man to lead in every operation ; some farms are far too big to allow a man to act as his own ganger, but some leader of every group there must be ; for men respond better to the call " Come on " than " Go on." As technique advances, the need for human toil declines but the zest for work must still be cultivated as it was in the days of our fathers. But our approach needs to be more realistic. Until the coming of machines the strong man of the farm was the object of every boy's hero-worship. Every farm had its George or Arthur who could carry a 2-cwt. sack of corn up the granary steps without grunting. (Our forefathers seem deliberately to have made jobs as heavy as possible—witness the 17-gallon churn.) In this enlightened age our boys are a little more critical, and the porter of 2-cwt. sacks calls forth not a gasp of envy but a recitation of the statistics of hernia and a dissertation on differential blocks and electric hoists. For every job, appropriate tools must be provided. Men do not like working with out-of-date tools, particularly if better equipment can be seen in use on neighbouring farms ; and good tools do not lessen the need for skilled manipulation; rather do they increase it. The precision of modern tractor rowcrop work far exceeds anything that could be achieved in the days of horses. Work with a buckrake demands the balance and equipoise of a wryneck.

Machinery At first glance it is surprising that all the machinery introduced into British farming during the past decade has not lessened the demand for workers. Theoretically, mechanization should result in the same job being done with less human effort; and that indeed is its first effect. In practice, however, we are finding on the farm, as the spinners of Lancashire found a century and more ago, that the ultimate effect of bringing in machines is to produce more ; and within limits that increases the call for labour. There is clear enough evidence that the machinery of the war and post-war years has increased our total output ; it has increased even our output per man. Many of the new tools have the added advantage of making work pleasanter as well as easier.

It is sheer bad luck that the opportunity for using machines more fully has come in times beset by so many financial difficulties. All down the ages it has been possible for a farmer to make his capital out of the fruits of his labours. Today but half those fruits are his own, and mechanization must be studied against the background of interest on bank overdraft. Farming is no longer a joint enterprise between landlord and tenant, each contributing a share of the capital. It is a triple alliance between owner, tenant and bank. In effect the machine adds, in loan charges, something like 15 per cent of its capital cost to the outgoings for ten years. Machinery therefore becomes a continuing commitment, justifiable only where continuing income can be foreseen. It is doubtful whether in reality anyone can predict the outcome over such a period. Hence all mechanical expansions are of their very nature speculative. In some degree, of course, this has always been the case, but the loss of savings is one thing, a commitment to future payments quite another. Much of the present bewilderment in farming circles about shortage of money arises from this drag of earlier-spendings on present profit and loss accounts. By and large it is probably the case that most equipment is bought, without close balancing of costs and returns, primarily as a means of getting jobs done more easily or more quickly. The whole burden of recent experience goes to show that the ultimate return, if there is one, comes in the form of additional work at some other task which the relieved labour is able to perform. For this reason machinery is seldom employed at anything approaching its full capacity—if such a term can properly be applied to tools designed for part-year service, as many of our machines necessarily are. Where, however, numbers of hands are limited, it is often sound business to make each pair abundantly productive by providing plenty of mechanical aids, even though the machinery, judged by investment standards, is yielding a poor dividend. This point is of especial validity on small farms where expenditure on tractor equipment for instance, altogether out of proportion to the acreage, is often justified in terms of saving of the occupier's own time.

Size of Team Owing to the small size of the team, a change in the number of persons employed on a farm is usually a serious decision to take. Increase or decrease of one man on a farm normally carrying but four is clearly a change of 25 per cent in the total strength. For this reason, call-up for military service bears with particular severity on farms employing youths. Most farmers try to work with a regular staff. A precise fit between labour requirements and supply is, considering the great variation from season to season, impossible : but fortunately the year's routine includes a certain amount of buffer work ; the level of upkeep of all those varied items which are commonly grouped under the term " tenant right " can, without serious consequences, be allowed to rise and fall according to season

and labour available. Thus a farm can be run with four and five men, for instance, in alternate years. A good deal of lending and borrowing of both tools and services goes on between small farmers everywhere, and a further balancing factor arising in recent years is the growth of contract work.

Nevertheless the fact remains that farm staffs tend to remain static, and farmers automatically tend to judge proposals for changes in the nature of their enterprises, or in the scope of the farm plan, by the simple criterion of whether or not they can be carried through with the existing staff. On most farms long tradition has established a cycle of tasks to even out demands for labour throughout the year ; in most areas there are known peak periods, known risks of one job overlapping with the next, and sometimes the start of one crop-job is controlled, not by the state of the season, but by the completion of the preceding job.

" Never start on the hay till your roots are finished" : " Get your muck out between hay and corn harvest " are common rules in the Midlands. There is much virtue in such rules even if there is often good cause for breaking them.

Job Analysis One of the great appeals of ensilage in the milk belt is that it helps to obviate the summer hay-roots-potatoes peak. There must be many similar points in work organization which would repay study ; the standards evolved by agricultural economists are perhaps a pointer to what may be achieved in time to come. For the immediate future, job analysis and detailed time-and-motion studies are likely to offer the most fruitful field of study. Our present methods of doing jobs have mostly been evolved during the long regime of the human arm, the ox, and the horse. And, of course, most of them are soundly conceived, otherwise they would not have survived. The three-cart system of transport, whether of corn inwards or muck outwards ; mowing while the dew is on the grass ; loading in the evening for unloading next morning, are obvious instances. But it is equally plain that many jobs are done in different ways, and with varying degree of human efficiency in different parts of the country. Midlanders interested in turnip hoeing return abashed from the Scottish lowlands, having seen the pace at which the job is carried out there. To heal their injured pride they have to move on into the South. But men are strangely wedded to what they are used to. Innovators must be prepared for the deadweight opposition of "You can't do that there 'ere." Many a man will continue in bad methods, even to his own detriment, merely because he is used to them. There's naught so queer as folk.

Yet such studies as have been carried out entirely justify the belief that most farm tasks are capable of easing and simplification. Most studies to date have concerned work around farm premises, where standardization is perhaps easiest to accomplish. We have no reason, however, to doubt that field studies would be equally revealing.

The report and proceedings of the Oxford Farming Conference can be obtained from the Joint Organizing Secretary, M. H. R. Soper, Esq., Department of Agriculture, University of Oxford, price 3s. 6d. (including postage).

GOOD BEEF AT LOW COST

N. S. PERKINS
Trefelyn, Mathry, Letterston, Pembrokeshire

Mr. Perkins discusses from a practical viewpoint some of the methods of feeding and management which he has found most successful in his quest to produce high quality beef at the lowest cost.

ANYONE producing beef as a business proposition must keep two points constantly in mind : it must be produced as cheaply as possible —which means that the main food must be grass ; and it should be of a quality that appeals to the consumers so that, when their demand can be fully met, home-produced meat will command a ready market. The factors which control the economy and quality of beef production are, of course, breeding, feeding and management. Good beef can be produced by good feeding from animals which are not bred for beef, but it may be a more expensive process. Alternatively, poor quality beef is sometimes produced from well-bred animals by incorrect feeding, due mainly to the animal not being kept on a sufficiently high plane of nutrition during the first year of its life. This practice also increases the cost of the final product. Of the two factors breeding and feeding, the latter is the more important but, on the other hand, cattle *bred* for beef produce more of the cuts that the housewife, given preference, would choose.

In this country we should produce as much beef as possible from cattle bred for the purpose. Our beef breeds are the best in the world—they are widely sought after, as foundation stock, and a very high standard has been reached by our pedigree breeders in the production of an animal with a good conformation, allied to the ability to convert its food into high quality meat at a relatively low cost.

With meat production at its present level some beef will have to be produced from our dairy herds as well. To do this, the dairy cow should be crossed with a colour-marking beef bull, since it is far too costly to attempt to fatten an animal that is in no way bred for beef. The resultant dairy × beef female should not be used for breeding ; she will produce beef on her own body but she will breed neither a beef nor a dairy animal, and it would indeed be a retrograde step to have again the so-called " dual-purpose " herds of mixed-bred cows. It should be remembered, too, that as the average life of the dairy cow is no more than three lactations, at least two-thirds of the dairy herd, including the best cows, must be used to breed replacements for milking. Only the cows which are not required for this purpose—not more than one-third of the herd—are therefore available for crossing with beef bulls. So if more beef is to be produced, every encouragement should be given to keeping more beef cows, rearing their own beef-bred calves, especially on land which cannot be put to better purpose.

Feed Well in the First Year So much for breeding—now for feeding, which is by far the most important factor in production. First, comes the initial feeding of the animal. As I have said earlier, a calf must be well reared and kept going for its first year. If it is not it will cost far more in food to produce a given quantity of meat, and will never make a carcass of such good quality as the calf which is correctly

reared. A large proportion of the beef produced in this country is from indifferently reared cattle which, after a store period, either have concentrates pushed into them at the end of their lives, or are marketed off grass in an unfinished condition. The former method throws the proportion of fat to lean meat completely out of balance, and both methods increase the proportion of bone at the expense of meat. These practices have meant that cattle have had to be kept many months and, in some cases, years longer than was necessary to produce the requisite amount of meat ; in consequence the meat has cost more per pound. In the Argentine, where best quality meat is produced (and was exported to this country before the war), all the cattle are reared on their mothers and never fed on concentrates.

The rearing of one calf per cow in this country has been strongly criticized, but the majority of the critics do not yet realize all the advantages of the system and to what extent the grass, straw and roots consumed by the nurse cow can save concentrates. A beef cow is the only animal that can produce a true-bred beef calf, and on a number of large farms much of the food she needs is not at present fully utilized. Moreover, the saving in the quantity of concentrated food as between her progeny and an animal not well reared and not bred for beef, is greater than the amount required to maintain the nurse cow. In summer, cows can run on pastures with sheep and thereby keep the land right for the sheep—something which cannot be done by either feeding cattle or dairy cows : they can also be used to clean-up pastures by an " on-and-off " system, which enables the feeding cattle or dairy cows to have grass always at its most nutritious stage. During the winter, nurse cows can be fed on straw and roots, and if they calve in the spring they may never need any concentrates throughout their breeding lives ; they will always go to the bull during the months of June or July, even when they are suckling their calves.

The system of rearing one calf on one cow cannot, of course, be adopted by all farms, but the principles that make this system so advantageous could and should, I maintain, be adopted by all beef cattle rearers. The principles are to start with a calf which is as well-bred for beef as possible, and start it in life as well as possible.

The Importance of Maintaining Flesh The first use that a young animal will make of its food is for growth ; any surplus to growth requirements will be utilized to put on flesh. In the long run, far less food will be required by an animal that was allowed to maintain its growth and the flesh it put on when a calf, than by one which, while maintaining its growth, was allowed to lose flesh and had to put it on again later in life. A fat animal is cheaper to maintain than one on which flesh is being built, especially when that animal is still growing, as a beef beast should be until it is slaughtered. Even though a spring-born calf is reared as well as possible during the summer, it must still be fed well throughout its first winter, and not allowed to lose flesh. If all these points are observed, that is, the cattle are bred for beef, reared well, and their calf flesh maintained, it is possible to make them all " super-special " grade at 2½ years old. And this can be done by feeding only grass, straw and roots, without any concentrates after the first winter.

Our own practice at Trefelyn is to feed daily in the first winter about 2 lb. crushed oats, 2 lb. sugar beet pulp, and ½ lb. linseed cake (or other high protein food, when available), with unlimited supplies of oat straw and water. If insufficient protein is available, it is advisable to increase the oats

and pulp. This will maintain the animal's flesh and, while it will not result in the same rate of growth, the practice may be justified on the premise that when the animal gets plenty of spring grass, which is so rich in protein, it will catch up its growth much more easily.

After the first winter there are times, of course, when cattle can very easily lose flesh, and special precautions are necessary. If, in the spring, cattle have only rich leys available to them and have no access to rough grazing or foggage, they should be offered some straw each day. The amount they will eat is negligible, but they seem to require some binding food whenever grazing is too rich or too wet. At midsummer they must have access to shade, for cattle "gadding" all day will certainly lose flesh. Any time after early August all young cattle are liable to husk. The method of prevention—which is so much better than having to effect a cure—is to get them as early as possible in August on to land that has not grazed cattle that summer ; that means on to hay aftermath or seeded stubbles. The latter is by far the best since the cattle get some dry food as well, and that is a great advantage when the weather is wet. Calves still on their dams rarely get husk, and two-year-olds usually resist it ; so only yearlings have to be watched.

Most cattle are allowed to lose flesh in the autumn, especially in wet years when there is plenty of grass. This grass goes through cattle very quickly, but its value can be greatly increased if some dry stuff is fed as well. So whenever the weather is wet after harvest, all cattle on grass should again have access to straw. Very small quantities will be eaten if there is plenty of grass, but the advantage to the grazing animal is great. Keeping cattle entirely on wet grass in the autumn may lead to their dunging too loosely and, if they cannot get at dry stuff to bind it, they will lose flesh which will cost a good deal to put back again. Straw has very little feeding value but at times it is invaluable as a binder.

Graze on Well-Manured Grass Grass is the best and cheapest of all foods for beef cattle. All the grassland of the country will *grow* cattle, and most of it will fatten cattle to a prime state if properly farmed. By " properly farmed " I mean that if the grass is fed with phosphates and lime and grazed at its most nutritious stage, it will in turn fatten the cattle that eat it. To graze all the grass at the right stage requires great skill and judgment, unless the farmer buys more stock when grass is plentiful and sells when grass is scarce ; in other words, buys when stock is dear and sells when stock is cheap—which is out of the question. If all the stock on a farm is reared, most farmers are short of grass from March to mid-May, and invariably have a surplus in July and August, especially in the western half of the country. This position is due, in part, to the system whereby grass is conserved in the form of hay, which cannot be made satisfactorily later in the summer. The result of this practice is that very high quality grass, which can be used by feeding cattle or milking cows and collected by them, is allowed to grow on and lose some of its feeding value when growing, and invariably a further, very large proportion when it is being made into hay. Such grass should be eaten by stock and the grazing season lengthened accordingly. In the west, and in the wetter parts of the country, haymaking means wasting extremely valuable material. There can be no point in keeping cattle off the spring grass in order that it can be made into hay for cattle in the following spring, when they will be kept off the grass so that more hay can be produced.

Reference has been made to lengthening the grazing season, and that is one of the vital factors in the economic production of meat. In normal seasons in the west, practically all cattle can be kept on grass from the beginning of March to the end of November. To get sufficient grass on March 1, it is necessary to utilize all the grassland and to apply nitrogen at the end of January and beginning of February. As the grass increases, so do the demands of the stock, augmented as they are by the lambs and calves born in March and April.

At Trefelyn, fat lambs and beef cattle are sold in August and September. About the same time most of the rearing stock go on to the seed fields which have been cleared of corn (incidentally, preventing the young stock getting husk). This leaves us with fields, that have been grazed throughout the summer, without any stock for them. These, I consider, are those that should be used for the conservation of grass, which at that period of the year is best turned into silage. We try to get as many cattle as possible off the land during the months of January and February, in order to make sure of grass in March. We do not normally use much silage when the cattle are in, but keep it as an insurance for the spring months or during a drought in the summer.

Dehorned Cattle To save labour—a considerable factor in economic beef production—the cattle should be run in sizable bunches, and this can be done only if the cattle are hornless. Unless naturally polled, calves should be dehorned within three days of birth ; it is a very simple operation today. When dehorned, thirty young cattle can be run together, provided they have sufficient trough room, without any of them being bullied and kept back.

Finally, a word about castrating the male calves. To avoid risk of infection, or injury by frost, castration should be done by the bloodless method at three days old : this latter point is important because at that age there is very little shock.

To sum up, the main points to be stressed in producing good beef economically are :

1. Breed for beef.
2. Feed very well for the first year.
3. Never let the cattle lose flesh.
4. Feed well-manured grass, at the right stage, for as much of the animal's life as possible.

BEEF PRODUCTION AT TREFELYN, MATHRY

Photo: *Farmer and Stock-Breeder*

Galloway cows with Shorthorn-cross calves on rough grazing.

Photo: *Geoffrey Hammonds*

Two-year-old Galloway × Shorthorn bullocks fattened entirely on grass.

Photo: *Ray Fellwell*

Typical turkey yard. The verandah in the background is used during the breeding season for broody hens.

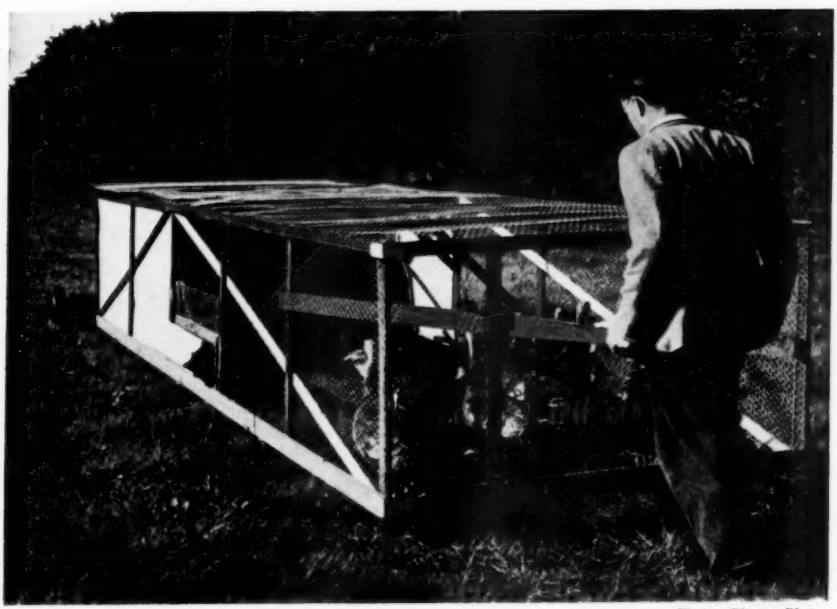
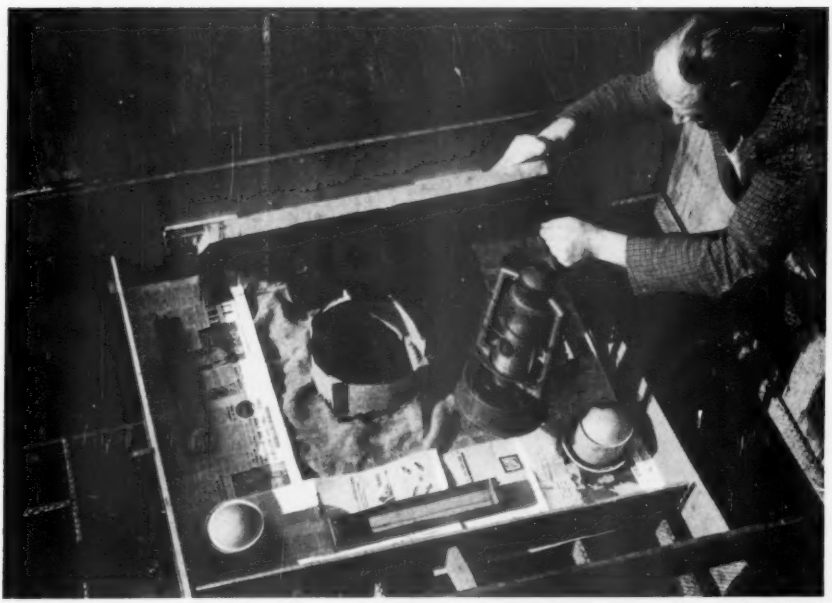


Photo: *Thomas-Photos*

A rearing fold specially designed for turkeys. Pneumatic tyres are fitted to assist in the daily move.

See pp. 75-8)

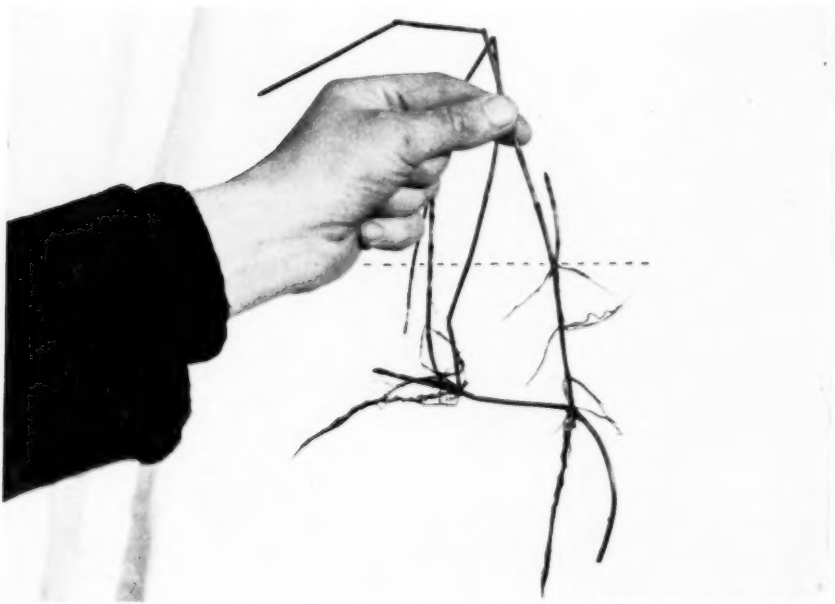
A Motley brooder and verandah.



Photos : *Thomas Photos*

Interior of Motley-type brooder prepared for day-old turkey poults. The paper is used to cover the wire netting for the first few days; the poults are prevented from straying too far from the source of heat by the barriers.

Left : Fertile shoot of horsetail with cone-like head.
Right : Fully-grown barren shoot.



Photos : *Farmer and Stock-Breeder*

Marsh horsetail (*Equisetum palustre*). Note the underground rhizomes below the dotted line, and young barren shoots just above it.

TURKEYS

RAY FELTWELL, N.D.P.

National Agricultural Advisory Service, South-Eastern Province

Because of the entirely erroneous impression that turkeys are difficult to rear, few farmers in this country keep them. Yet, after the first few weeks, they are reasonably hardy and easy to house and manage intensively. Given good management, they will reach market condition in six months.

TURKEYS have never enjoyed the popularity to which their advantages undoubtedly entitle them. To some extent this has been due to the mistaken view that they are rather delicate creatures and are difficult to rear. The consequent reluctance of many farmers to keep them has resulted, therefore, in turkeys being available only at Christmas. Even then, prices have usually been high, and the supply of English birds erratic. Moreover, this seasonal demand has by no means been met in the last few years. Here, then, is a challenge, for there can be little doubt that tremendous opportunities for expansion exist for those able to supply the food for the birds.

Despite their name, turkeys did not originate in the Middle East but are natives of America, and were unknown in Britain until after the discovery of the New World. It is not known when turkeys were first domesticated, but Prescott (1) showed that, before the time of Columbus, the Indians kept turkeys under conditions of domestication, and placed great value on their meat. Nor is it possible to say exactly when turkeys were introduced into Europe, but it would appear to have been prior to 1525 and was probably soon after the discovery of Mexico in 1518.

It has been suggested, even in the last few years, that turkeys were brought to Europe at a much earlier age—possibly by the Vikings. This theory, however, was pure guesswork and was based largely on a frieze depicting turkeys that came to light in 1939 in Schleswig Cathedral, Germany. The art experts who inspected the frieze asserted that it was positively thirteenth century (2,3), and this apparent discovery led to the development of many dreams of contact between the Old and New Worlds prior to Columbus. The story was, however, soon exploded by Stresemann (4) whose work, published in Germany, was apparently overlooked owing to the interruption of communications in war-time. A recent translation of the work shows that, according to Stresemann, the frieze was, in fact, painted about 1891, and was the work of Olbers of Hanover.

Turkeys offer the farmer who is prepared to grow his own food an excellent means of meat production and one that fits in well with farming practice. The birds are bought at a day old, or at eight weeks, and are normally marketed within twenty-eight weeks. Where the producer is catering for the autumn and winter demand, one-third of the turkeys' food requirements may come from the old harvest and two-thirds from the harvest of the year in which the turkeys are hatched. A further advantage is that large quantities of home-produced green foods, e.g., kale and lucerne, may be used, and in some circumstances consumed directly off the field.

Thanks to the experiments of the National Institute of Poultry Husbandry and to the pioneer work of the late Ernest Stevens, who for many years was Poultry Advisory Officer for Buckinghamshire, and of William Motley, a well-known turkey breeder in Hampshire, it has been demonstrated that

large-scale turkey rearing can be most successful, provided balanced diets and labour-saving systems of housing and management are adopted.

The bogey that turkeys are extremely difficult to rear has been laid, and although care must obviously be exercised at all times, once the initial breeding and rearing period has been passed the birds are extremely hardy and their housing demands simple.

Modern methods of turkey production are largely intensive and seek to eliminate or reduce the losses from Blackhead and other diseases by sound methods of management. There are three main systems from which to choose : the so-called Motley system, the turkey yard, and the folding system.

The Motley System The Motley system is based on small units, and the turkeys are kept off the ground by means of wire-netted or slatted wood floors for the whole of their lives. Simplicity and improvization are the keynotes of the system and only two houses are used for all stages. During the first eight weeks of life, the poults have access to outdoor, wire-floored brooders that accommodate 75 birds. The temperature is maintained in each brooder by an oil lamp, and food and water-troughs are provided. The unit is so designed that the droppings fall directly on to the ground and need not be removed, unless disease is suspected or occurs, until the end of the season.

Interchangeable wire floors of two sizes are used—$\frac{1}{2}$-inch mesh for the period 0–4 weeks, and $\frac{3}{4}$-inch, 16 gauge wire from 4 to 8 weeks. At four weeks old, the birds are given access to a slatted or wire-floored verandah, and at eight weeks they are shut in the verandah, where they remain until marketed at between twenty and twenty-eight weeks of age.

The verandah need not be made of expensive materials and may be built largely of home-grown timber, galvanized iron and wire netting. A standard-size verandah unit, 18 feet long, will house 25–30 turkeys from eight weeks until marketed for table. The unit is 3 feet 3 inches high to the eaves, has an apex roof, and is 5 feet in width ; the width is important, for 5 feet has been found in practice to be most convenient for handling the turkeys without having to enter the verandah. This width also allows the droppings to be removed, whenever necessary, without undue trouble. The floor of the verandah is built at least 20 inches above the level of the ground. Where wire netting is used for the floor, $\frac{3}{4}$-inch mesh of 16 gauge will be found most suitable. If wooden slats are used, they should be 2 inches wide, $\frac{1}{2}$ inch thick and placed $\frac{3}{4}$ inch apart.

Turkey Yards The turkey yard system, which seeks to reduce housing costs and, by the use of outside pens and large groups of birds, to keep labour demands low, has a great future. Naturally, the concentration in large flocks has certain disadvantages, and greater losses due to disease, cannibalism and other vices may usually be expected. Nevertheless, yards allow large numbers of turkeys to be housed at very low cost per head, once the birds are twelve weeks old. Generally, it is wise to rear the turkeys intensively or on the Motley system until they reach this age, when they should be hardy and able to stand outdoor conditions.

During the last few years, and particularly since the introduction of the new drugs designed to control Blackhead, yarding has become most popular ; for the birds are merely enclosed in compounds, which may or may not provide any covered shelter. Flocks of 500 poults or more may be run

together with a minimum yard allowance of about 10–12 square feet per bird. It is a good idea to provide protection from prevailing winds by enclosing the yard to a height of approximately 6 feet, and corrugated iron or wire-baled straw is very useful for this purpose. If straw is used there should be wire netting on the inside of the yard, to a height of 6 feet, to prevent the bales from being pulled to pieces.

The yard itself requires frequent additions of fresh straw, very much in the same manner as the straw in bullock-fattening yards is renewed. The system is found to give very satisfactory results and, at the same time, large quantities of valuable farmyard manure are produced.

Some farmers have developed a system of yarding by night and grazing by day. In this the flocks are managed on very similar lines to sheep, being driven out to the green crops by day and controlled under a folding system, or perhaps by strip grazing.

The Folding System The folding system employs units, of very similar general design to those used for chickens, which are moved to fresh land daily. The folds allow the maximum use to be made of grassland, and the turkeys contribute substantially to the fertility of the soil.

Although fold units of the " Golden " type will give reasonably successful results from a day old, most farmers prefer to rear the turkeys intensively, at least until four weeks of age and more generally until eight to ten weeks.

At four weeks, "Lumb " type hay-box folds, with 25 poults to each unit, will give good results until the turkeys are old enough to be transferred to a rearing fold.

A turkey rearing fold for 15–20 turkeys from eight weeks until maturity, measures 6 feet wide, 3 feet 3 inches high and 18 feet long. It is desirable to cover the sleeping portion of the fold but the remainder may generally be enclosed by wire netting. Perches are probably preferable in the units but many farmers dispense with them altogether.

Feeding Feeding can make a most important contribution to the success of a turkey venture, and it is essential for the diet to be carefully balanced at all times. In general, the nutritional requirements are similar to those of chickens but there are important differences, particularly in respect of vitamins and minerals. Considerable quantities of home-produced foods may be used, but these must be properly blended with purchased foods so that the whole diet contains all the nutrients necessary for good growth. Compiling rations can be a difficult task, and it is a good idea to consult local officers of the National Agricultural Advisory Service and ask for their suggestions on how to prepare the most suitable diets from the foods available.

The system of feeding will generally depend on the foods used, and dry or wet feeding, or a combination of the two, will give good results. Provided the diet is suitable, it is possible to adopt all dry mash feeding, and, if necessary, the fresh green food may be replaced by good quality dried grass.

The Time to Buy The time of year at which the turkeys are bought depends very much upon when the birds are to be marketed, and this again is influenced by the breed. The Bronze and the White turkeys

reach the optimum marketable condition at twenty-four to twenty-eight weeks of age, whereas Norfolk Blacks, which are smaller birds, may reach prime condition at about twenty-four weeks. Early maturity is a point that can be influenced by selective breeding, and some strains may be ready for killing at an even earlier age. Where turkeys are kept too long, the amount of food necessary to produce 1 lb. liveweight gain increases rapidly. It can be seen, therefore, that it is wise to select the date of hatching very carefully. April-hatched turkeys will generally be ready for killing from September onwards ; June and early July-hatched poults (depending upon the strain) are usually the most suitable for the Christmas market.

New Varieties of Turkeys The Broad Breasted Bronze turkey has aroused a good deal of interest during the past few years. This variety carries a much higher proportion of edible flesh than the normal turkeys, for the breasts are particularly broad, and the thighs also carry more flesh. The original stock from which the Broad Breasted Bronze was developed came from England and was first introduced into British Columbia in the late 1920s by Jesse Throssel. From there it spread to the United States, where very intensive selection was made. Broad Breasted Bronze turkeys, in the form of hatching eggs, have recently been reintroduced into this country from Canada and America in some numbers. Many of our breeders are now experimenting to develop strains of broad-breasted turkeys, and it is anticipated that, when the initial difficulties are overcome, stock will be available for distribution.

The Beltsville Small-type White turkey, another comparative new-comer, was developed by the United States Department of Agriculture to combat the difficulties experienced in selling very large turkeys. We are now facing a similar problem in this country, for the limitations of the modern purse, and the modern oven, mean that very large turkeys, weighing 20 lb. and upwards, are no longer popular with the housewife, although the hotels still prefer these birds.

The Beltsville, which is probably smaller than most of the other varieties and averages about 10 lb. in weight when marketed at twenty-four weeks of age, is now arousing great interest. It is rapidly gaining popularity, and numbers have recently been imported into the United Kingdom. Its white plumage gives it an attractive appearance, and the breeding stock have the additional advantage that egg production is generally higher than with many other varieties.

The writer wishes to acknowledge the help of Dr. D. L. Lack, the Director of the Edward Gray Institute of Ornithology, Oxford, without whose active interest the subject matter relating to the Schleswig Frieze would not have been re-discovered.

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THE ORGANIZATION OF LABOUR ON THE FARM

The informality of an agricultural Brains Trust is often the best way of stimulating interest and the cut and thrust of free discussion. The following Q. and A. are taken from a recent meeting of farmers organized by the W. Suffolk A.E.C. at Bury St. Edmunds.

Members : W. E. CAVE, of Everleigh, Wiltshire, G. H. N. PETTIT, of Imperial Chemical Industries Ltd., ERIC REA, Provincial Director, N.A.A.S., South-Eastern Province, and C. G. SOAMES, of the Transport and General Workers' Union.

In the Chair : W. F. JOHNSTON.

Q. *Farmers in the better parts of the United States appear to obtain very much higher output per worker than we in Britain. Ought farmers to concentrate their main effort on closing this gap? What would the Brains Trust consider should be the value of sales off the farm per man employed per annum?*

Rea : We have heard a good deal about this problem in recent months since the return of the productivity team. We were told a lot about this higher output in the United States. When we look at the conditions in which they are farming, I don't think it is surprising. In this country the pattern of farming is entirely different ; no two neighbouring farms are alike: they are not the same in size : they don't produce the same crop, etc. In other words, there is much greater diversity. In the United States the pattern of farms is similar, the climate is similar, and the same range of crops is produced ; for example, vast areas grow maize. Mechanization is carried out by sharing ownership. A farmer does his own cultivations first, then his neighbour's. But I don't think we could apply that system in this country, owing to the diversity of farming. I question whether the workers in the United States achieve so much greater output than our own farm workers. Our own men do a very good job, and the output per man has increased in this country. Farm workers have a record of which they can feel proud. Therefore, I question the statement that the American farmer is so much ahead of us.

Ought farmers to concentrate their main effort on closing this gap ? Yes, by stepping up the output. There are two things to concentrate upon : first, mechanization ; secondly, more careful planning and organization– in other words, better farm management.

Pettit : Where our output per man per annum is £1,000, in the United States it is round about £2,000. There are all sorts of reasons for this. It is a new country and the American farmer has an entirely different approach to problems. He thinks how best he can plan around a new thing rather than how to fit something into an old pattern.

Cave : I think Mr. Rea has adopted a defeatist attitude. In talking about the output of the farm worker in this country, I think we should make it quite clear that we are not reflecting on how hard the worker works. It is primarily the farmer's job to organize the work so that it can be done without undue fatigue. The output of the British farm worker is extraordinarily low. But I don't think this is any reflection on the worker ; rather is it a reflection on the farmer.

We have heard Mr. Rea tell us that the conditions in the United States are very different from ours in this country. That is undoubtedly true.

But when we hear these remarkable figures quoted to us we are still not told how they do it in the States. If they tell us how they achieve these results then, perhaps, we could try their methods over here.

As to whether farmers should concentrate their main effort on closing this gap, I think it would be a mistake to concentrate mainly on this. The main effort should be to increase the output per acre. I think that is the most important thing. It is also important that serious consideration should be given to making labour more productive. As you know, labour is the biggest single cost on most farms. It would be a great mistake not to give very serious consideration to this.

How much per worker should one get ? I agree with Mr. Rea entirely that there is a terrific variation owing to the nature of the products produced, etc. I think we should get at least £1,000 per worker, but this I would regard as very poor. I should aim at between £1,500 and £2,000.

Soames : I feel that we should think a bit deeper as to whether the output in the United States *appears* higher, or whether it is *real*. I should like to see the worker in this country getting a bigger share of that £1,000–without income tax, of course ! It would be a better incentive.

Cave : I think it is a matter whereby we must try to overcome many of the conditions which are impeding our progress in this country. For instance, it might be worth while to make our smaller fields into bigger ones by filling in ditches, and thus save labour on hedging and ditching.

Chairman's summing-up : We seem to have jumped about all over the place ! But we are agreed that the information about the United States is not full enough. We want to hear more about the conditions and methods used in the States. We agree there is a gap and that better organization would benefit us.

* * *

Q. *Which would the Brains Trust consider the better method :*

(1) *to farm with a minimum of labour with limited output and making a good income, or*

(2) *carrying all labour possible and obtaining full production but lower income ?*

Pettit : Why say in the second half of the question, " carrying all labour possible " ? Surely, we don't farm just in order to make jobs. We farm in order to produce a lot of stuff and to do it as efficiently as possible all round : the best use of land, labour, machines, etc. Linking this up with the previous question, we must remember to keep our eye on different objectives from those of the Americans.

Cave : I disagree with the question. It implies that if you carry all the labour, you get a lower income. That is entirely wrong. As your production increases, so should your income go up. There is another aspect : anyone who is fortunate enough today to be occupying a farm has a duty to the nation, a nation which is short of food, to make the land produce the maximum amount of food. I feel there is far too much talk in farming circles on the effect taxation has as a deterrent to maximum production. If you are in the fortunate position to be a farmer, then you have a duty to the nation to make your land produce as much as possible and, at the same time, make the most profit out of it. If you have to pay super-tax then you should say to yourself : " Thank God I am in that fortunate position ! "

Rea : Far too few people realize the serious position we are in, not only in our own country but in the world as a whole, concerning food production. And the answer seems to me not which are the best methods but how to achieve the maximum production.

Soames : Too much emphasis is laid on income rather than on production. We should get down to the question of maximum production without consideration of income. If we can produce more by employing more labour, then we should get down to employing more labour. Where labour is available, we should use it and produce as much as we can.

Chairman's summing-up : It is unanimously agreed that we must think first and foremost on how to achieve the maximum production. Maximum production is a national necessity. Of course, we should also keep a watch on our income as well.

* * *

Q. *With a view to attracting suitable young men into agriculture and retaining their services, does the team agree that there should be an incentive to enable a worker, having qualified to a certain standard, to receive by right a rate over and above the standard?*

Soames : In my view there is little incentive for the worker. If there was a ladder for the young worker to climb it would give him a bigger incentive to employ his knowledge and aptitudes. If he could pass a certain standard then by right he should have an opportunity of obtaining something above the minimum wage, once he has qualified. With regard to incentives in the form of bonuses, etc., I agree with this entirely. It does give the man an opportunity of earning more if he applies himself to the job by doing more than the standard requirements. If a man can do more than the standard required then he should be recompensed accordingly. Piecework and bonuses are an encouragement.

Cave : Yes, I agree with Mr. Soames. Incentive payments make people work harder and make them produce more. Where they are worked out fairly, there is everything to be said for them. I have tried many of these schemes ; some work, some don't. You have to be careful to adopt only those that work well. Don't give incentives which result in bad practices. I do think the best way is to give your good men a wage comparable with their skill.

Pettit : I agree with the two speakers. It is difficult to work out such schemes. It often happens that by the time one has worked out what is considered to be a fair scheme it has become so complicated that few could possibly understand it. There is the danger, for example, that in giving a bonus on milk production, the worker will try and feed the cow as much as he can lay his hands on ! Many profit-sharing schemes have been tried out in various industries ; they seldom work.

Rea : Standards are bound to vary. We agree that incentives are valuable but they should be applied with a good deal of common sense.

Soames : A good farmer will recompense a man for what he does. But we have to guard against those employers who are not quite as good. Someone should be the judge of that right, other than the employing authority. The whole thing should be looked at from the worker's angle. It might be a good thing to take the worker into your confidence. It might also be a good idea to have profit-sharing.

Rea : To establish a right would lead to no end of complications.

Cave : I support Mr. Soames on this matter of right. It runs throughout the professions where, when extra qualifications are obtained, there is promotion. After all, the farmer has always the right to sack a man if he is not pulling his weight. If you want a skilled man, and he holds a diploma, then you must pay for that skill ; the fact that he holds a certificate justifies a higher wage. Diplomas would give a right to a higher wage. In my experience, the highest-paid man on the farm is far and away the cheapest.

As regards profit-sharing, I think there is very considerable danger in this. It would undoubtedly lead to discontent.

Chairman's summing-up : All agreed that incentives are a good thing and that they would lead to better production. But human nature being what it is, one has to be careful how to apply such incentive schemes.

* * *

Q. *Should there be a retiring age for farmers ?*

Cave : Yes, most certainly. Retire at 45 with a good pension !

Rea : There is the problem of farmers who are getting too old for the job, whilst thousands of young, experienced men are unable to get into farms. No doubt it would cause an upheaval, but it would be a good thing to have a retiring age. Most industries and professions find that it is in their best interest to have a retiring age. Wherever you get Trade Unions well established, you will find that they are anxious to get retirement going. In my opinion, 78 would be a suitable retiring age.

Soames : I think that from the worker's angle it would not matter when the farmer retires. I don't agree that income comes from the managerial capacity of farmers. It is often from the skill and ability of the man on the job. I don't think we should miss the farmer, even if he retires at 45 !

Pettit : Who is going to do the flinging out ? I should like to put a word in for common humanity.

Cave : This is a good point. I don't imply that all young farmers are good, and all the old ones bad. The older farmer, however, has had difficulty in adjusting himself to the changing conditions since 1939. He still uses the old methods and thinks in the same way as he did in 1939. It is only natural as you get older to become less receptive to new ideas. We must think of our country's position as a whole, and the need for greater output, and balance against this the hardship which might arise in pensioning-off the older men, particularly the inefficient farmers.

Chairman's summing-up : Whoever has the task of doing this is going to have a heart-breaking job. Mr. Pettit urges us to apply the milk of human kindness in arriving at any decision on the question of retirement.

* * *

Q. *Should output be assessed in terms of money or in terms of quantity ?*

Pettit : A comment on that question is that a lot of our trouble in the post-war period has been due to substituting Whitehall controls for the free prices by which the public shows what it wants.

Rea : The great problem is world shortage. What we need is a settled, stable production policy for the next 5–10 years, with a reasonable profitability attached to it.

Cave : In trying to assess the quantity of food produced off the farm, we come up against an extremely complicated task. We know what £s per acre means. Most of us have to present our accounts to H.M. Inspector of Taxes. We can compute the output per acre in £s. It is the easiest, if not the best, way of expressing it. I am sure that if in the present period of food shortage, you allowed prices to find their own level, you would find that some of the luxury food would command high prices and be very profitable. I know it is easy to make fun of the people in Whitehall who make these decisions, but I am certain there would be greater hardship for many people if those decisions were not taken. We have to produce the maximum volume of food and not go in for the most profitable things which may be regarded as luxury.

Chairman's summing-up : The greatest amount of food per acre should be produced but you cannot altogether disregard the £ s. d. The opinion of this Brains Trust is that in the present circumstances the thing we must think of first is quantity per acre, but not disregarding the £s.

* * *

Q. *Since 1939, the tractor force has increased over five times, whereas up to 1949 the labour force remained almost static. Does the Brains Trust consider that output has increased in proportion, or are we over-mechanized?*

Cave : This question ties up with the earlier question we had about the output of profit per man. I think we have inclined to build up an extravagant amount of mechanization, adding machine upon machine, but still retaining the same amount of labour as we had previously. I think the output has gone up as a result of mechanization because we are able in our variable climate to do our cultivations at the time they should be done. This was not possible when we had to rely on horses; when, for instance, it was a real struggle to get the ploughing done in time. I cannot think what would have happened in the wet spring of last year without our machinery strength. We could not possibly have got all the work done and the corn sown in time.

The amount of depreciation of the implements on my own farm, and the repairs we have to do, have grown to a staggering degree. We must see to it that the machines are used properly. It has astonished me, whilst visiting various farms, to see the amount of machinery lying about idle. We have yet to learn how to make the best use of our machinery, how to use it efficiently.

Rea : We are tending to become over-mechanized in this country. The key to the whole situation is to have timely operations. There is a lot of talk about machinery displacing labour. That is not the function of machinery. Its most important function is timeliness of operation, and the taking out of the drudgery from farm work, such as machine milking, mechanized muck spreading, muck loading, etc. The increase in the country's output is due in large measure to the use of machinery, but there is the danger that we are becoming too highly mechanized. We must think out a way of planning our equipment better, and not just rush in to buy these expensive things.

Pettit : We can blame the war for some of these not so good bits of mechanization. When the war broke out the main issue was on the question—tractor versus horse. More attention should be given to the type of farm when planning for mechanization, and what are the most important tools and equipment. One of the questions we are often asked is how much cheaper

is a combine harvester in comparison with the older method of the binder? What really matters, however, is the wider issue of labour organization—whether the combine gives a greater saving throughout the year. We should be told much more about the actual results of mechanization rather than whether one machine is better than another.

Rea : In other words we should talk more about the management of mechanization.

Soames : The machine has undoubtedly taken a considerable amount of drudgery out of farming, and as a result we are producing more per man, which is a credit to the worker.

Rea : One of the results of mechanization is that we are now making farm work far more attractive, and a worker, instead of being a drudge, uses less brawn and a little more brain. The present-day farm worker is much more skilled, versatile and better educated.

Chairman's summing-up : Although we may be over-mechanized, it is agreed that we are doing our job better and producing more. And that is the important thing. Indeed, this seems to be the underlying theme of most of the questions this evening. It is also agreed that the worker today has to use his brain far more than he did before.

* * *

Q. *Can the Brains Trust offer any suggestions about the training of young workers, and do they consider it worth while to take trouble in this direction?*

Soames : The results of the various training schemes introduced during the war years, and later, have been a credit to us. They could well be expanded. The apprenticeship scheme shortly coming into operation will give an opportunity of really training people for agriculture. One of the handicaps in agriculture has been, I feel, that too many boys are allowed to go on to the farm without a proper system of training. I do feel we should devote more time and energy to the training of agricultural workers.

Rea : Is it worth while taking trouble? Most emphatically, yes. Mr. Cave has told you that the best-paid man on his farm is the best investment. Why is he the best-paid? Because he uses his brains. As for training, the various courses arranged are well worth supporting. The extra value from this will soon recompense the farmer.

Cave : Any training, as long as it is good training, does do a lot of good to a young man. We should recognize that most of the training must be done on the farm. Weekend courses are excellent, but most of the training should be on the farm. When a boy leaves school and takes up farm work, don't start him off with jobs which break his heart. Consider him. Think of him in the future as a potentially first-class worker. Treat him in the same way as you would a young horse (when we used horses), handling him carefully in the early stages. It will repay you for the trouble you take in " breaking him in " to work properly.

Pettit : We must work out our own ways regarding details in farming. We must be alive to such things as transport difficulties as experienced by those living in the country.

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THE ORGANIZATION OF LABOUR ON THE FARM

Q. *Many of the bigger farmers include in their tractor strength a heavy machine limited to a few jobs. Would they be able to organize more effectively if they had all small to medium tractors?*

Cave : It depends very much on the farm. I think a crawler tractor is a great asset. I consider that we have gone too far in this small tractor business. I think that is one of the reasons why Americans get a greater output per man: generally speaking, their tractors are very much larger than those used by us in this country. I think it is easier to drive a crawler tractor pulling a big implement than to drive a small one. I find that for winter ploughing we can frequently plan much better with our crawler tractor. On the bigger farms there is a definite place for the large crawler tractor, but on most of the farms the tendency has been to have too many small tractors.

Rea : You can't split your team with tractors so well on a lot of small jobs as you can with horses. A crawler is an expensive thing to keep. I think we have gone too far with rubber tyres, the cost being far too heavy. As for half-tracks, this requires one field to work in and another to turn round in !

Pettit : On the purely arable farm there is often a strong case for the heavy tractor. The mixed farm is often easier to organize with extra small to medium tractors.

Soames : The question to be borne in mind is whether it is possible to organize one's labour force more effectively if we have small or medium tractors ? It is just as easy to drive a large one as a small one. Drivers should be capable of driving either. It does not matter much whether the farmer has a large one for important jobs or relies on contracts. It depends on what work is being done on the farm. I am not prepared to recognize that our agricultural workers are not capable of driving both machines if called upon to do so.

Chairman's summing-up : It depends entirely on the circumstances, size of farm, etc.

NATIONAL DIPLOMA IN AGRICULTURAL ENGINEERING

An examination for the National Diploma in Agricultural Engineering will be held at the Essex Institute of Agriculture, Writtle, near Chelmsford, Essex, on Tuesday, September 16, 1952, and following days.

Forms of application for permission to sit the examination may be obtained from the Secretary, the Institution of British Agricultural Engineers, 24 Portland Place, London, W.1, on or after Thursday, May 1, 1952. Completed forms of application must be returned, together with the examination fee and the necessary certificates, by Saturday, July 19, 1952.

THE CONTROL OF HORSETAIL IN PASTURES WITH MCPA

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Marsh horsetail is a pernicious weed of low-lying pastures. Dr. Plant records in this article his success in eradicating the weed from his Somerset farm by low volume spraying with MCPA.

THE presence of horsetail or mare's tail in pastures situated in low-lying grazing areas, such as occur in Somerset, is common. In the case of my own dairy farm of 110 acres, half the area is derived from peat moor reclaimed over one hundred years ago. The peat lies on clay, and the water-table is so near the surface for the greater part of the winter that grazing is possible only between May and October. These pastures, so suitable for dairying in a dry season, support three principal weeds, creeping buttercup (*Ranunculis acris*), rush (*Juncus spp.*) and horsetail, (*Equisetum spp.*). The first two are a nuisance—the third is a curse.

The effect of *Equisetum* on the milch cow is disastrous, and the decline in milk yield caused through grazing the weed for any length of time would ruin any dairy. I have known my own herd of Guernseys drop in milk from 77 to 65 gallons between evening and morning milkings after they had grazed *Equisetum* pastures for a few hours. The same effect can be obtained if the weed is accidentally fed in hay or silage. It is now known that *Equisetum* contains a thiaminase, which as an enzyme has anti-aneurin properties (1). The practical effect of this metabolic disturbance is to cause loss of appetite and scouring in the cow and unthriftiness in young stock.

The genus *Equisetaceae* has two species common to agriculture and horticulture. The one I want to deal with—*Equisetum palustre* (marsh horsetail)—has two types of aerial shoots and a rhizomatous rooting system. The underground rhizomes, or stems, creep and branch extensively and, in April, send up shoots which produce cones of spores at the head. These are known as fertile shoots (see p. iv of art inset). The other type of aerial stem—barren shoots—may arise at the same time and persist after the fertile shoots have died down. In the early stages of growth, the barren shoots are snake-like and consist of pointed, pale green shoots. Whorls of branches subsequently appear at the internodes and the resemblance to a horse's tail is apparent. It is these green shoots, intermingling with the herbage, which cause the trouble. A grazing animal will normally leave the large barren shoots and will eat them only if she cannot avoid doing so, as might happen if they are present in a leafy ley, or if she is driven by hunger to indiscriminate grazing, as might occur on rough pastures.

The eradication of this weed can gradually be accomplished by drainage and good husbandry, using fertilizers, rolling, mowing, and intelligent grazing. Such procedure, however, is slow and tedious and, in the light of recent herbicidal advances, uneconomic.

Use of MCPA The common horsetail (*Equisetum arvense*), which occurs in gardens and nurseries, was found by Jackman and Tincker (2) to be susceptible to the selective herbicide MCPA (2-methyl-4-chlorophenoxy-acetic acid). One application a year over a period of three years completely killed the weed. It would appear that in this work the MCPA was applied to the soil in powder form, and the active herbicidal

ingredient diffused into the root system and the underground part of the barren shoots. However, the amount of MCPA applied was considerable and, on a field basis, this practice would be far too costly.

Modern advances in crop spraying now enable us to tackle such a problem in a different way and I naturally took advantage of the " low volume " technique in dealing with the fields infested with the weed at Tickenham. The appropriate quantity of MCPA was diluted in 10 gallons of water and applied with low volume equipment. The results of the different treatments were :

Amount of MCPA (diluted in 10 gallons of water)	Time Taken to Kill Barren Shoot	Adventitious Shoots
pints per acre	*days*	
2½	5–6	none
6	2–3	new shoots 3–4 weeks after spraying

Similar results were obtained when oil was added to the spray.

It can be seen that, using 6 pints to the acre, the results were not permanently successful. The barren shoots were killed but adventitious shoots soon appeared from the base of the shrivelled stem. The effect of the herbicide on the shoot is to cause it to bend and buckle ; later it turns brown and gradually dries up. When 2½ pints per acre were used, however, the shoots were longer in dying and there was no regeneration of barren shoots.

The efficacy of the low concentration might be explained in the following way. If the chemical compound applied (in this case, MCPA) can be transported to the root system, the tissues will eventually die. But this can be achieved only if the herbicide travels down the barren shoots into the root. If the shoots are quickly killed, as happens with high concentrations of MCPA, there is no chance for the substance to pass down the aerial portions into the root since the conveying or vascular system has been put out of action. It is also of interest to speculate on the significance of the cessation of nutrients and other food materials passing upwards from the roots to the shoots in the event of the latter being killed too quickly.

Low Volume Spraying I have always considered that low volume spraying at a rate of 6 to 15 gallons per acre was as important to success as the correct concentration of herbicide. The task of covering the barren shoots with a deposit of the spray, especially when they are protected by leafy grasses, is extremely difficult. There are, in fact, certain underlying principles which determine effective spraying operations : the barren shoots must be long enough to expose a fairly large area to the spray ; the sward must not be so thick or advanced in growth that the shoots of *Equisetum* are completely shielded. The farmer has, therefore, to choose a time when he feels confident that the spray will leave a deposit on every shoot. Because of the late spring in 1951, we did not start spraying *Equisetum* pastures until June 1. Seven days later it was possible to cut grass in these fields for buckrake silage, whereas previously the presence of horsetail would have ruled it out entirely. In the same way, a crop of hay was taken 4–5 weeks after spraying, when the killed shoots had entirely disappeared.

It is possible to spray pastures containing *Equisetum* any time from May to the end of September, depending on the use made of the pasture. As MCPA is non-toxic to animals, a field can be sprayed whilst animals are

grazing in it. Such conditions might apply to store or dry cattle where it would be inconvenient to move them to other fields.

Rushes and Buttercups It is more than likely that where horsetail thrives the rush and buttercup also find a happy hunting ground. Fortunately, both these weeds are killed by MCPA, but they require a concentration of 5 pints per acre, that is, twice the amount required to kill horsetail. Where I am faced with a field infested with rush, buttercup and horsetail, my practice is to spray at the rate of 5 pints MCPA per acre and to follow this 6–8 weeks later with the specified concentration (2½ pints) for horsetail. Obviously, the first application would kill the barren shoots, but a fresh supply would grow again. As a general rule, whenever incomplete control of horsetail is obtained, a second application given when the barren shoots have again grown to about 6–8 inches high, will effect a 99 per cent kill.

Further Management The eradication of horsetail by MCPA is a notable advance in agricultural science, but I do not think the farmer has done the best for himself or posterity unless he considers replacing the weeds with nutritious grasses and legumes. Rough grazings which have been cleaned up with herbicides are invariably short of phosphates; the lime status may need checking and attention ; and other plant nutrients may be lacking. Unless these are added, the good work already done by the spraying tackle will be nullified.

Having eliminated horsetail, we have mostly applied phosphatic manures. As a result, more silage and hay has been made and grazing over the whole farm obtained. At the same time, the head of stock carried has been considerably increased and a larger milking herd can now be kept, since there is more home-grown, high quality silage and hay available. Our 1951 average for a pedigree herd of Guernseys was 9,750 gallons at 4.75 per cent butter fat.

Feeding this winter with silage and hay made from fields which, before spraying with MCPA, had been infested with *Equisetum*, has caused no fall in milk production. The cost of applying the herbicide with low volume equipment was £2 per acre. The appreciation in value of the land and the increased amount of grass conserved or grazed from this land makes this one of the best farming investments I have ever made.

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ANNUAL AGRICULTURAL REVIEW

Statement circulated by the Minister of Agriculture to the House of Commons, April 24, 1952.

ON behalf of the three Ministers responsible for agriculture in England and Wales, Scotland and Northern Ireland, I am glad to be able to inform the House that after a full review of the economic condition and prospects of the agricultural industry a schedule of farm prices has been agreed which in the current national circumstances is considered both by the Government, and by leaders of the three N.F.Us. to be properly related both to the economic condition of the industry and to the task before it.

The results of this review and the decisions arising from it must be seen in their proper perspective. They provide a firm foundation for the long-term policy which the Government is working out in conjunction with the leaders of the industry and should create that confidence in the future which is essential if the industry is to respond effectively to the national need. At the same time the Government recognizes that this price award is not, of itself, a comprehensive programme covering all the many aspects of farming on which farmers have to plan ahead. The Government is, therefore, pressing on urgently with discussions on these other aspects of policy and I shall announce our conclusions as and when they are reached.

One aspect we shall immediately discuss with the National Farmers' Unions is the minimum prices for livestock and livestock products for 1954-55 and 1955-56. The Government intend to raise minimum prices for livestock products from their present unrealistic level to something much nearer current prices.

The Agriculture Act provides for varying the methods by which its objects are achieved. By this award we are fixing prices for livestock products up to March 31, 1953, and for the 1953 crops, and we shall shortly be fixing minimum prices up to 1956. In respect of any of these prices it may become possible and desirable to vary the methods of implementation. Any variation will of course be the subject of consultation with the industry and our object will be to maintain therein the value of the awards now made.

I come now to the review itself. There is general agreement as to the *character* of the task ahead. It is, in broad outline, to produce not only more feed for our livestock but also as much wheat for our own consumption as we reasonably can and enough potatoes to satisfy consumption demands ; to maintain our supplies of milk and eggs ; but above all to do our utmost to produce more meat.

The *extent* to which the industry can respond to this call will depend upon its economic condition, upon its efficiency, and upon the tools which can be made available for the job. Above all, it will depend upon the farming community's appreciation of the national need, its sense of responsibility and its adaptability.

Agriculture will have its full share of the nation's economic resources and we look with confidence to the men and women in the industry to raise still further the efficiency with which they produce food from our resources

of land, labour, capital, equipment and knowledge. The Government intend, with the full support of the leaders of the industry and with all the emphasis it can command, to inaugurate a special drive to increase output and make the fullest use of the land. We shall take vigorous action to ensure that the limited area of agricultural land in the country is neither used inadequately nor misused through incompetence.

Responsible and representative agriculturists agree with the Government that with the resources that are or will be made available a valuable increase in net output of food can be achieved by improvements in the production and use of grass, in the yields of crops and in the management of livestock and by a further substantial increase in the tillage acreage. By 1956 the industry can be reasonably expected not only to have reversed the present downward trends in production, but to have raised net output to at least 60 per cent above pre-war.

Because the majority of our farms are small, and the men who farm them find it particularly difficult to finance expansion in output in the face of rising costs, we have tried to mitigate where possible the adverse effect of cost increases and so avoid the need for undue increases in farm prices.

We have decided to hold unchanged until March 31, 1953, the basic release prices of feedingstuffs. We propose also to lay before the House a scheme for continuing ploughing-up grants ; and a scheme to extend the subsidy on fertilizers ; and, subject to the necessary statutory authority, to authorise the renewal of a calf subsidy. For this last purpose we have allocated a total of £4½ million and we have agreed with the industry that we shall jointly work out a scheme under which this amount will be devoted not only to a subsidy on suitable steer calves but also to its extension to heifer calves of recognizable beef types.

There will be increases in farm prices as set out in the schedule which I am circulating. These, together with the subsidy arrangements I have mentioned, and the continuance of the price increases announced in November as a result of the Special Review then held, should enable the industry both to meet the higher costs which have arisen during the year and to finance the programme for the further expansion of output.

The cost of the award will in the normal way be taken into account by my Rt. Hon. Friend the Minister of Food in announcing the retail price increases necessary to bring the food subsidies down to the rate of £250 million a year announced by the Chancellor of the Exchequer in his Budget proposals.

The country's economic difficulties, coupled with the actual and prospective world shortage of food, especially meat, make it essential that more food should be raised from our own soil. The just and constructive award which I am now announcing should lead to significant improvement in the supply of home produced food for the consumer. It should remove from the industry any hesitation about future prospects and provide a real incentive for every farmer to go vigorously about his job of raising output and thus playing his full and indispensable part in strengthening the country's economy and the nation's defences.

SCHEDULE

Crop Prices for 1953

	Present 1952 Price (approx. annual average) [a]	Addition for 1953 Harvest to Existing Price Schedules [b]
	s. *d.*	*s.* *d.*
Wheat, millable, per cwt.	29 6	1 3
Barley, minimum price per cwt.	23 6	1 6
Oats, minimum price per cwt.	21 2	1 0
Rye, minimum price per cwt.	22 0	3 0
Sugar beet, per ton (*c*)	112 2	4 6
Potatoes, average per ton (*d*)	239 0	5 0

(*a*) Price fixed after 1951 Annual Review plus Special Review additions (November 1951).

(*b*) Existing schedules are as announced on March 29, 1951, and November 29, 1951, subject to grade and seasonal variations.

(*c*) Average for beet of 15.5 per cent sugar content. An alternative method of payment in relation to sugar content is to be negotiated for 1953.

(*d*) The discount for sub-standard ware potatoes of the 1953 harvest is to be negotiated. The 1952 price quoted is for standard ware.

Prices of Livestock and Livestock Products

PRICES TO OPERATE FOR THE LIVESTOCK YEAR TO MARCH 31, 1953

(with provision for retrospective payments as announced)

	Approx. average Annual Price for 1951-52 [a]	Addition for 1952-53 to Existing Price Schedules [b]
	s. *d.*	*s.* *d.*
Milk, per gallon (*c*)	36.60	1.54
Fat cattle, per live cwt (*d*)	120 8	3 6
Fat sheep and lambs, per lb. dressed carcass weight including headage payments ..	2 5½	1
Fat pigs, per score dead weight (*e*) ..	53 8	1 6
Hen eggs, per dozen sold through packing stations	4 4¼	2½
Duck eggs, per dozen, minimum price ..	3 1¼	2½
Wool, per lb. (from 1/5/52)	6 0½	*minus* 1 6½

(*a*) Including November 1951 Special Review additions calculated over a full year, but not including elements included in 1951-2 prices as once-for-all additions in respect of a deferred Special Review in 1950.

(*b*) Existing schedules are as announced on March 29, 1951 (excluding the once-for-all additions) and November 29, 1951, subject to grade and seasonal variations.

(*c*) Part of the price increase will be used for additions to the production bonuses. The 1951-52 price quoted includes production bonus, quality premiums and attestation bonus.

(*d*) The price increase will be limited to adult clean cattle. The 1951-52 price quoted relates to steers, heifers and cow-heifers only, and includes quality premiums.

(*e*) The average increase of 1s. 6d. will be concentrated on clean pigs. The 1951-52 price relates to the quality weight range.

FARMING AFFAIRS

The Convenience of Kale One great merit of kale is that it produces a lot of food per acre. Crop for crop, kale gives about three times as much carbohydrate and protein as oats. This is a very important point now that a high degree of self-sufficiency is not only imposed on farmers by feedingstuffs rationing but is also good business, since the cost of home-grown foods is a fraction of the cost of purchased concentrates. A ration of 60 lb. of kale with 12–14 lb. of hay and 3 lb. of oats is sufficient for a cow giving 2 gallons a day, and the farmer who can supply this for much of the winter is on easy terms with the feedingstuffs officer.

The long period over which kale can be sown makes it a convenient crop on the farm. A catch crop of rye, winter oats or rape, and Italian ryegrass can extend the grazing season at either end by providing keep in November and again in March-April and still be clear of the ground in time for a full crop of kale. Until recently the main object in deciding when to sow kale was to escape the fly, but now there are dusts which will control this wretched pest. On good land full crops of kale can be obtained from sowings as late as June.

It is unreasonable to expect a heavy yield unless the crop is done well. Farmyard manure, if it is to spare after the needs of potatoes or sugar beet have been met, gives good response and it is a mistake to cut down nitrogenous manuring just because dung has been applied. A generous, but not excessive, allowance of fertilizer would be 8 cwt. of National Compound 1A (or its equivalent in "straights") on the seedbed, with 2–3 cwt. of a nitrogenous fertilizer as a top dressing when the broad leaves are out, and possibly 1–2 cwt. of " Nitro-Chalk " a month after that.

Rowcrop work should be started as soon as the rows can be seen, and a week later there should be a full inter-row hoeing with the blades set to within an inch of the young plants ; three or four weeks after that there should be a third hoeing between the rows just before these over-top. Many people do not single kale nowadays (indeed, if the crop is to be folded off it is better left unsingled) and it is often difficult to get much hand hoeing done. In a good growing season kale may grow so luxuriantly that weeds in the row never get a chance, but more often than not they prove troublesome—especially fat hen which may grow through the canopy. Spraying with sulphuric acid (100 gallons of 10–12½ per cent acid per acre) is much cheaper than a late hand-hoeing and it cleans up the weeds beautifully without seriously harming the kale. It should be done when the kale is 8 inches to a foot high and should be followed immediately by the final top dressing with " Nitro-Chalk."

Cutting and carting kale to cattle every day is admittedly an unpopular job, but on all except heavy soils it can be avoided. Folding behind an electric fence is becoming more common every year and it reduces the total cost of growing and using the crop by about one-third. Many farmers try to leave low places in the crop for the fence by sowing rows of cabbages, swedes or Hungry Gap kale but these are not really necessary ; when the fence is set it is little work to walk back along it with a hook and lop off the tops of the plants that are touching the wire. It is very important to allow a wide enough frontage ; if the cows are huddled together there is bound to be a lot of bullying and the weaker sisters, generally the heifers, will not get their fair share. The length of fence should be 2 to 3 yards per cow and with a fair crop 3 to 5 rows will then provide a ration of 60 lb. a head. For the first day or two a larger area must be given, or they won't have room to move, and some wastage must be expected, but it only takes a few days to

find out how many rows they will clear up nicely. Cows will eat their fill in an hour and a half and then tend to wander back over previous days' areas picking odd bits of leaf and stem left on the ground. Surprisingly enough, they get very thirsty and they should be allowed a run-back to a grass field where there is a water trough.

Farming Cameo 19. Lancaster: Centred on Lancaster, the county town, this district, which comprises some 100,000 acres, including 30,000 acres of fell and rough grazing, is bounded to the north by Westmorland, to the east by the West Riding of Yorkshire and on the west by the sea. Southwards it extends as far as Garstang. The country is undulating, rising from Morecambe Bay to heights of over 2,000 feet in the hills of the Yorkshire border, but it is sparsely peopled and there has been little industrial development. The soils are mainly of the boulder clay type derived from Millstone Grit, although there are smaller areas of limestone and mossland with some alluvial soils, found mainly along the coast and in the river valleys. Of the latter, the most notable is that of the Lune.

The association of a cold soil and a high rainfall make this essentially a grassland area suited to the rearing of stock and sheep and to dairying. On the higher land the fells are mainly "white," though some heather is found, particularly in the region of the Trough of Bowland.

The typical " family farms " of the district average about 80–100 acres in size with stone-built houses, steadings and outbarns, and fields bounded by thorn hedges and stone walls. Although the practice is dying out, men are still hired for a term of six months at Whitsuntide and Martinmas. There is a shortage of farm cottages and hired men customarily live in the farmhouse.

The rearing of dairy stock is the main enterprise of the area, the most popular breed being the Friesian. There are many noted pedigree breeders and a great deal of attention is being paid to attestation, and in consequence, the district has already gained a high reputation as a source of high-class Friesian stock. Animals are kept for one, two or even three lactations before being sold into the intensive milk-producing areas of Lancashire. Considerable progress is being made in improving buildings to bring them up to T.T. standards.

Sheep play an important part in the farming system, especially on the higher land to the east. Many horned breeds are kept, including the Blackface, Swaledale and Dalesbred, and, to a less extent, the Lonk. The ewes are normally put to a horned ram for about three crops and then are often crossed with the Wensleydale. In the lowland areas, the popular cross for the production of fat lambs is the Suffolk on the Greyfaced Halfbred.

Naturally, in a mainly grassland district hay and silage form the basis of winter keep and milk production, but some arable crops such as oats and roots are also grown for stock-feeding. These are carried in a simple rotation which includes a two-, three- or four-year ley.

Poultry-keeping for the production of eggs for both the hatcheries and the commercial market is an important sideline, while pigs, though not widely kept, are increasing in numbers. An increase is also noticeable in beef production which, by tradition, is based on the salt marshes of the coast and in the Lune Valley, where there is a large area of rich, alluvial land that, with generous treatment, will fatten on the average a beast and a half an acre. In addition, some rearing of beef stores has developed in the hill areas during the last few years, under the stimulus of the Hill Farming and Livestock Rearing Schemes.

J. E. Park,
District Advisory Officer

Land Organization in Undeveloped Areas With the world population steadily increasing, it is obvious that to maintain even the present standards of nutrition there must be a substantial increase in farm production, particularly in certain backward countries where, despite the scope for advancement, output has actually decreased in recent years.

To a very large extent the problem of production in these under-developed countries is bound up with the size and poverty of their farm populations. Thus while their output per acre is not necessarily much lower than that of some predominantly industrial countries, the fact that, in Asia and Africa, for instance, three out of every four people are dependent on agriculture means that the more important figure of output per person per year is dangerously low, averaging less than a quarter of a ton in Asia, or an eighth of a ton in Africa, as against the equivalent figure of 2½ tons recorded in North America.

Causes of low productivity in agriculture are many—poor soils, unfavourable climates, poor management, inadequate equipment, dense rural population—and all are important in varying degrees. But perhaps the greatest influences on rural living standards, and hence on output, are the many forms of agrarian structure and systems of land tenure which exist throughout the world.

The realization of the importance of the part played by some of these systems in impending economic development led the General Assembly of the United Nations to instruct the Food and Agriculture Organization to investigate the subject. Although the scope of the inquiry was considerably limited by the lack of time and reliable data, their recently published report* demonstrates only too vividly the diversity of the problem.

The outstanding feature of the agrarian structure of many under-developed countries, revealed by the inquiry, was the small size of the average farm holding. Clearly, it is impossible to establish a general criterion as to what size constitutes a minimum for economic operation since this will depend a great deal on the type and intensity of cultivation. Nevertheless, it was obvious that there are many countries in which large numbers of farms are too small to provide the subsistence necessary for the cultivator and his family, or to permit of any improvement in cultivation methods. In Egypt, for example, 72 per cent of owners farmed holdings of 1 feddan (1.038 acres) or less.

The second point brought out by the report is the considerable variation in the proportion of tenants to owners. In some countries, such as Cyprus, Egypt and Turkey, most of the farmers own their land. In Asia, as a whole, however, the number of owner-occupiers is small. Broadly speaking, it would appear that until recently, about one-half of the land in Burma, China, India and Japan was worked by tenant smallholders, while in Iran only 15 per cent of the claimed land is owned by the farmer.

A tenancy system is not unsatisfactory in itself, but in many of these under-developed countries it is characterized by exorbitant rent charges and lack of security. Rents are payable in many forms—in money, produce or labour. There is, of course, much variation in practice, depending often upon the services rendered by the landlord, but equal division of crop between landlord and tenant is common in India, Syria and Indonesia. Fixed produce rents, assessed in advance of harvest, were once customary in, for example, Japan, where they varied from 50 to 70 per cent. Cash rents

* *Land Reform.* Obtainable from H.M. Stationery Office, price 5s. (5s. 3d. by post).

are not a general feature of the countries covered by the investigation except for special crops.

Farmers generally hold land in many backward countries on a customary rather than a legal basis. In consequence there is often great insecurity and poverty, as in Burma in the 1930s when it was shown that the number of tenants who had cultivated the same plot for more than three years represented only about a quarter of the total.

Among the other major impediments to sound agricultural development in the under-developed regions, revealed by the inquiry, were the concentration of land in large estates and plantations, offering small returns and no share in management, exorbitant taxation, and inadequate provision for credit. In certain countries also no system of registration of title exists and consequently disputes about ownership arise continually. The lack of adequate legislation on water rights is another defect which, in those parts of the world where water is scarce, may lead to considerable hardship. In certain areas it is relatively easy for a wealthy landowner or speculator to buy the water rights of a holding in order to compel a small farmer to sell his land.

In describing the main problems as they exist today, the report emphasizes that land reform, if it is to be effective, must aim at improving all the social and economic conditions affecting farm life. Many of the benefits which might be expected to result from reform of the land tenure system will be nullified if steps are not taken to provide appropriate facilities to the newly-established small farmer. The provision of credit, co-operative marketing, advisory, technical and health services are among the major requirements. Tax policies designed to lighten the burden on the small farmer and on farm labourers are also considered essential.

Death of Mr. R. R. Ware The profession of land agency and the agricultural industry as a whole have suffered a grievous loss in the sudden death of Robert Ware on April 15, at the early age of 48. The blow will fall with particular severity on the Ministry of Agriculture and Fisheries, to whose service Ware had devoted the last four years of his life. He came to the Ministry with the highest of reputations already established, first in private practice, then in the Army during the war, and later with the Control Commission in Germany. He came, not without personal sacrifice, to help to set up the Agricultural Land Service, of which he was the first Director. He brought to this task a combination of wide agricultural knowledge and experience, of proved organizing ability, and of quite exceptional qualities of mind and spirit ; and none could have done it better. The high standing of the Land Service is itself a tribute to Ware's leadership and inspiration. His advice, never given without modesty, was that of a master of his subject and was always illumined by intellect and common sense. His actions were invariably based upon the loftiest principles of his profession and his personal beliefs. His place as Director of the Agricultural Land Service and as Chairman of the Committee on Agricultural Valuation, will be extremely difficult to fill. His place in the hearts of the countless friends and colleagues by whom he was admired and loved cannot be filled.

A Career in Forestry : Entrance to Forester Training Schools Increased opportunities for young men between the ages of 19 and 30 to take up a career in forestry are offered by the Forestry Commission. Free tuition and board and lodging are given during training in Forester Training schools and, certain cash allowances are also made. In certain cases as little as six-months' practical experience of work in the woods may now qualify a man for admission to the schools ; and the Forestry Commission will help suitable candidates to obtain this. Selection of candidates is by interview, followed by a simple written examination. Candidates holding the General Certificate of Education or its equivalent may be exempt from the examination.

There are five Forester Training Schools : The Dean, in Gloucestershire ; Lynford Hall, in East Anglia ; Gwydyr, near Bettws-y-Coed, North Wales ; Benmore, Argyllshire ; and Glentress, near Peebles. Training includes practical work in the woods, as well as class-room instruction, and on the successful completion of a two-year course, a Forester's certificate is awarded. Men with this certificate are qualified to take up supervisory posts on private estates, with the Forestry Commission, or in the Colonial forest services.

Boys leaving school may now have places reserved for them in Forester Training Schools, to be taken up at the age of 19, or after National Service. Full details regarding entrance to Forester Training Schools can be obtained from the Chief Education Officer, Forestry Commission, 25 Savile Row, London, W.1.

Stock Poisoning by Paraffin Paraffin poisoning of animals is rare, but fatal cases among cattle have occurred after consuming paraffin or other fuel oils intended for tractors. It is important, therefore, that these oils should not be left about the farm where stock can get at them. No doubt, most animals will show no inclination to drink this kind of material, but some may, and the result is likely to be serious, if not fatal.

BOOK REVIEWS

An Introduction to Agricultural Economics. ROBERT C. ROSS. McGraw-Hill. 42s. 6d.

The science of agricultural economics as an aid to the farmer in the conduct of his business was a subject of university study in America long before it had reached that status in Britain, and students here are indebted to American economists for their pioneer work. The volume under notice comes from the Professor of Agricultural Economics in the University of Illinois, and though it is based entirely on American land use and farm experience, there is much in it of interest and value to the British agriculturist.

Starting from the Declaration of American Independence, the earlier chapters are devoted to the evolution of the history of the land in the States. Professor Ross traces the acquisition of land by cession to the United States Government, and by annexations and purchases which turned a territory of some 800,000 square miles in 1790 to one of more than 3,000,000 in the next 63 years. Farming had developed in the South on the plantation style, with tobacco as the chief cash crop and principal export, to be followed after the Revolution by cotton. The development of commercial agriculture, as the clearance of the land proceeded westward, as transport facilities increased and machinery became available, is described, and the history of changes in farm organization and farmers' experience is continued to the end of the second World War. There are many parallels to our own experience. The problem of farm capitalization and credit ; the development of farming types ; ownership and tenancy ; the use of tariffs, first levied to produce revenue but soon applied as protection from competition ; price booms and slumps ; marketing and co-operation ; these and other aspects of farming policy and practice all have their counterparts in Britain.

After chapters on taxation and the farmer, land-use and conservation, the latter dealing effectively with the soil erosion problem and the measures which are only now being applied to check the damage done and to restore soils not already too far depleted, Professor Ross comes to that part of his subject which will be of greatest use, perhaps, to the British agriculturist—the systematic study of farm management. Dealing with a country which has been settled by representatives of nearly all the countries of the old world, one which by comparison with Britain has no agricultural tradition, and where farming types are more sharply defined and segregated, the American farm economist has had a simpler task to pursue and a more receptive audience to address. But the account of the farm surveys organized, of the records obtained from farmers to give details of capitalization, stocking and labour requirements, of the systems of purchase and sale of requisites and products, and data concerning the organization of rural society—all of it collected, tabulated and studied as the basis of an extension service to promote better farming, better business and better living—should be a stimulus to many workers in the same field on this side of the Atlantic.

C.S.O.

Some Crop Protection Problems in World Agriculture. (International Conference, Fernhurst, June, 1951). Plant Protection Ltd., 61 Curzon Street, London, W.1. 18s.

Reference was made in the August 1951 issue of AGRICULTURE to the International Conference organized by Plant Protection at Fernhurst at the end of June. The complete record, with verbatim papers and ensuing discussion, has now been published by Plant Protection—and a very impressive survey of crop protection interest it makes. The attractiveness and value of this publication extends far beyond the personal interest which the delegates who attended this three-day conference will inevitably attach to it. There must surely be extremely few people, whether professional or professorial, farmer or student, who will not read it with deep interest and draw from it profitable understanding. When we remember how real is the menace of hunger to multitudes of the world's expanding population, we cannot but recognize that the reduction of the immeasurably heavy losses caused every year by crop pests and diseases is a first claim on the social conscience.

Chemist, pathologist, and botanist have between them recently given us insecticides, fungicides and weed-killers far and away more effective than some of the materials upon which we have had to rely, and the machinery firms are now devoting a good deal of skill and ingenuity to provide an extending range of spraying and dusting machines. Operationally, there are many problems, not least those raised by the diversity of climate and terrain and the needs of the small men. As Dr. E. Holmes pointed out : "A major portion of the world's agricultural production still comes from the tiny holdings of individual families—the fellaheen of Egypt, the ryots of India, the peasant cultivators of Uganda and the like. These men have no access to mechanized equipment and have been rather sadly neglected in the past. Much more imagination and ingenuity will have to be exercized before the benefits of modern crop protection can be brought to these small cultivators."

Effective control of pests and diseases can be secured only by international action. Conferences such as this at Fernhurst recognize that fact and by their initiative promote that interchange of ideas and problems without which there can be no progress at all.

S.R.O'H.

Irish Agriculture in Transition. JOSEPH JOHNSTON. Blackwells. 15s.

Written from both the historic and economic points of view, this book describes the changes that have taken place in the past hundred years in the agricultural organization and production of the Republic of Ireland (and of all Ireland prior to 1922), and makes certain suggestions for future developments.

The book is divided into two parts. The first dwells upon the evils of the old landlord-tenant system, and shows how, under various Land Acts from 1880 to 1920, these were removed by making the tenants owner-occupiers. It outlines also the snags of the owner-occupier system, and goes on to show the serious consequences of the economic war with the United Kingdom from 1932-38 and the effects of the second World War, both of which helped to turn Irish agriculture from its traditional policy of concentrating on livestock products for the United Kingdom, towards an increase in tillage and production of food crops for direct human consumption at home. Finally, it deals with the changes in the post-war period, when the farming system has again been influenced largely by the British needs for livestock products.

The second part of the book deals with present-day trends and problems and discusses the increasing importance being attached to grass, to livestock products for export to the U.K., the tendency in the milk-producing counties to replace the dual-purpose Shorthorn

with pure dairy breeds, and the slow but steady progress of mechanization. Problems mentioned include the small size of farms, lack of capital, conservatism and lack of local leadership in farm circles.

As to the future, the author believes that Irish agriculture must provide a higher level of employment and higher output per man and per acre. To further these aims he makes a strong argument for having a large co-operatively-owned farm in every district, to be run on scientific lines and providing various central services, including a pool of machines for hire to the smaller farmers around. In this way he suggests that leadership would be introduced and the difficulty of mechanizing and servicing small farms partially overcome. The activities of several existing co-operative farms are described in support of this argument.

Those who are familiar with the temperament and outlook of Irish farmers may doubt the practicability of the proposal, or even its effectiveness should it be put into practice. Yet, it must be regarded as a step in the right direction. It is a more democratic and practical solution to the problems of the small farms than some already suggested or in operation. Although it tends to over-simplify some of the problems, this book provides much food for thought, and should prove enjoyable reading to all interested in agricultural development.

J.A.Y.

The Elveden Enterprise. GEORGE MARTELLI. Faber. 21s.

A large part of the Elveden Estate in West Suffolk, was once a huge tract of bracken and heather on poor, blowing sand—an area which for centuries offered only a doubtful paradise to rabbits, and was avoided by most men—except naturalists and highwaymen. Mr. Martelli has given us a unique chronicle of an estate of 23,000 acres, of which 9,000 are being farmed as a single unit by the second Earl of Iveagh, and in so doing makes a notable contribution to the history of the West Suffolk Breckland.

For the countryman, it is interesting reading throughout. The stories of large game bags and of shooting parties with royalty and statesmen, who came to share the hospitality of a great countryman, will soon fade into history. Elveden was, and still is, a centre where labourers, farmers, scientists, and students meet to witness " science with practice." To the layman, the politician, and the historian, this book is an account of a challenge to mother earth : of a determination to master a problem and, above all, to set an example—a golden rule for all husbandmen—to leave a heritage better than it was found.

The theme of the book is the search for knowledge and its application to the farming of this once problem land, concluding with a good account of the reclamation methods employed. After setting up 50 miles of fencing against rabbits, a farming system has been built around lucerne. The account of the cropping rotation, with barley taken in the fourth year after reclamation, indicates the consideration given to the gradual building up of fertility, rather than the immediate rush for a cash crop. The author rightly points out that whilst Lord Iveagh is a rich man, the motive behind this enterprise was the determination to overcome the difficulties besetting a poor soil because he foresaw the future problem of decreasing food supplies and an increasing population.

Here is a story of heathland reclamation by a man who believed in his land ; who, in spite of bad times, continued his search for knowledge, convinced that the land could produce crops. A pioneer of Tuberculin Tested milk, Lord Iveagh brought cows into a desert, and with livestock for muck and money, he grew lucerne for food and fertility. A new system of farming has been evolved, to which many have flocked to witness. The author has successfully packed a mass of interest into his pages and, above all, has paid a tribute to a man who has created a new system, whose name will be entered with Coke and Townshend.

P.J.O.T.

Modern Market Gardening for Profit. W. E. SHEWELL-COOPER. Benn. 12s. 6d.

All the author's well-known ability is apparent in this book. It contains a mass of information, presented in an interesting and understandable form, and of special value are the chapters on modern techniques and practices.

I did not altogether agree with the author's very original classification of market gardeners into eight groups, the last of which is designated " The Mechanized Market Gardener " : with today's high labour costs, mechanization should be common to all types of holding. The chapter on tools and machines is excellent and the advice financially sound. The author has rightly departed from the conventional ideas of rotational cropping and sets

out concisely the general principles underlying planned cropping. One chapter in particular which the practical grower should find invaluable is that on the kinds and uses of fertilizers and lime. Sound advice is given on market-gardening operations; and on the subject of rotary hoes, I agree with his comments on the blade versus tine controversy. It is hoped that, in spite of the author's experience with the flame gun, he will try again, for a flame gun of the right type, if used correctly, has as great or greater possibilities as selective weed-killers which the author rightly recommends with reserve.

The author is also to be commended on his recommendations on quantities and costings —subjects few writers have the courage to tackle—and the appendices of statistics are very useful. The cultivation of individual crops is particularly well covered, and the special chapters, including one on the several forms of low coverage, will be found most valuable, as will also the chapter on overhead irrigation. In short, this is a first-rate book that most market gardeners will want to get.

H.W.A.

Modern Poultry Keeping (2nd Edition). LEONARD ROBINSON. Crosby Lockwood. 24s.

The second edition of Leonard Robinson's excellent book is a delightful blend of theory and practice that ranks as one of the most comprehensive of up-to-date British poultry manuals. The language is plain and the style so refreshingly pleasant that it will appeal as much to the working poultryman as to the student and scientific research worker. Mr. Robinson has succeeded in catering for many tastes, and there can be little doubt that this is, in no small part, due to the painstaking and time-consuming research that has obviously been put into the preparation of this informative work.

The author has not hesitated to deal with matters that are still the subject of great controversy, and the poultry breeder can read of the claims and attainments of such diverse personalities as Lerner, Hagedoorn, and Henry Wallace. As is opportune in these days of increasing world shortages of food, a good deal of space has been devoted to the pressing problem of feeding and nutrition. The farmer, striving to make the most of home-produced foods, will find valuable hints on compiling and balancing diets. Here he will read of the newly-available coupon-free food, condensed fish solubles, which, it is claimed, " has given as good results as fishmeal when added to vegetable protein diets". The vitamin B complex is also carefully discussed, and special reference has been made to the animal protein factor.

During the author's long association with the poultry industry, he has built up a unique reputation for accurately reporting practice, and interpreting scientific results. His latest work has enhanced this reputation, and *Modern Poultry Husbandry* will no doubt remain a standard text-book for a considerable time.

R.P.F.

Horses on Farms Today. D. H. EVANS. University of Nottingham School of Agriculture. 1s. 6d.

The rapid development in the mechanization of farm operations, especially in the last decade, has brought in its trail a consequential, if not commensurate, reduction in the number of working horses on British farms, until today only about one-twentieth of the draught power is provided by the horse. But, how much farther should this displacement of horses by mechanical power be allowed to proceed ?

This booklet is an attempt to sum up, as concisely and comprehensively as possible within the space of 22 pages, the many divergent views as to the present and future place of the horse on the farm. The author briefly traces the growth of horse-power from its introduction in agriculture in the mid-eighteenth century to the peak of 1910, and through the subsequent decline. He examines, on the one hand, the advantages of the tractor in speed, timeliness, adaptability and improved cultivation, and compares it, on the other hand, with the value of the horse on small farms, in carting on wet lands or, perhaps, in time of fuel shortage. Much detailed and up-to-date information is also given as to the cost of maintaining horses and the use made of them in certain areas.

It is for every individual farmer to consider whether the mechanization of his own farm could economically be increased or whether, indeed, it has gone far enough. A point, too, that should not be lost sight of is, the author suggests, the useful combination of horses and tractors—and this has particular application to small farms.

L.W.T.

BOOK REVIEWS

Mushroom Growing. R. L. O. JACKSON. English University Press. 9s. 6d.

The only way to obtain a balanced view (of mushroom growing) is to discuss the subject with as many other growers as possible, using books for the groundwork, says Mr. Jackson in his introduction. What his book tells us, in fact, is how *he* grows mushrooms, and in that context he is perfectly entitled to hold personal and independent views. His narrative all along is stimulating and frequently helpful ; it is only when his dogma overruns into the field of personal inexperience that criticism can be levelled.

Mr. Jackson says that English growers should base their yields on the amount of compost used and not on the bed area, whereas the calculations are quite distinct ; the former is a matter of costing and the latter an index to the cropping potential of the farm. He describes ventilated cartons with transparent moisture-resistant windows as the answer to the packing problem; with available materials it certainly is not. Dealing with the Tray System, he lists among its advantages the more vigid control of spawn growth, which surely has little relation to facts. And the Tray System is *not* in any way bound up with the quick-composting process.

But, taken with discretion, and seasoned with much discussion, the book proves to be a palatable dish for the mushroom grower.

F.C.A.

Pest Control Farmers' Handbook (10th Edition). 1952.

A new edition of Pest Control's handbook for the farmer comes opportunely. Here again is stressed the vital need for higher yields of food per acre and a reduction of the toll taken by weeds and pests. An earlier edition of this handbook estimated home losses so attributable as 1,667,000 tons of corn, 1,450,000 tons of potatoes, 222,000 tons of sugar, and other foods, in all worth £180 million at 1950 prices.

The well-ordered information on pest control here given, whether relating to contact and systemic insecticides, fungicides or selective weed-killers, will certainly be of infinite value to farmers of all kinds. A notable feature is the marginal annotation of the various chemicals to show their toxicity to spraying operatives, farm stock and bees, and the inclusion of a code of safety precautions.

The book is well illustrated, in black and white and in colour, and is obtainable free on application to Pest Control Ltd., Harston, Cambridge.

J.L.

Cirencester. Batsford. 7s. 6d.

To those with the interest and inclination to explore it, the old market-town of Cirencester has much to offer of architectural charm and historical association. As with other Cotswold towns, its medieval prosperity was based on wool, to which some of the lovely old houses of mellowed Cotswold stone and the names of streets still testify. Some fifty of the town's chief glories, as seen through the lens of Mr. A. F. Kersting's camera, are here attractively presented and framed very neatly by a short historical essay by Mr. R. L. P. Jowitt.

J.L.

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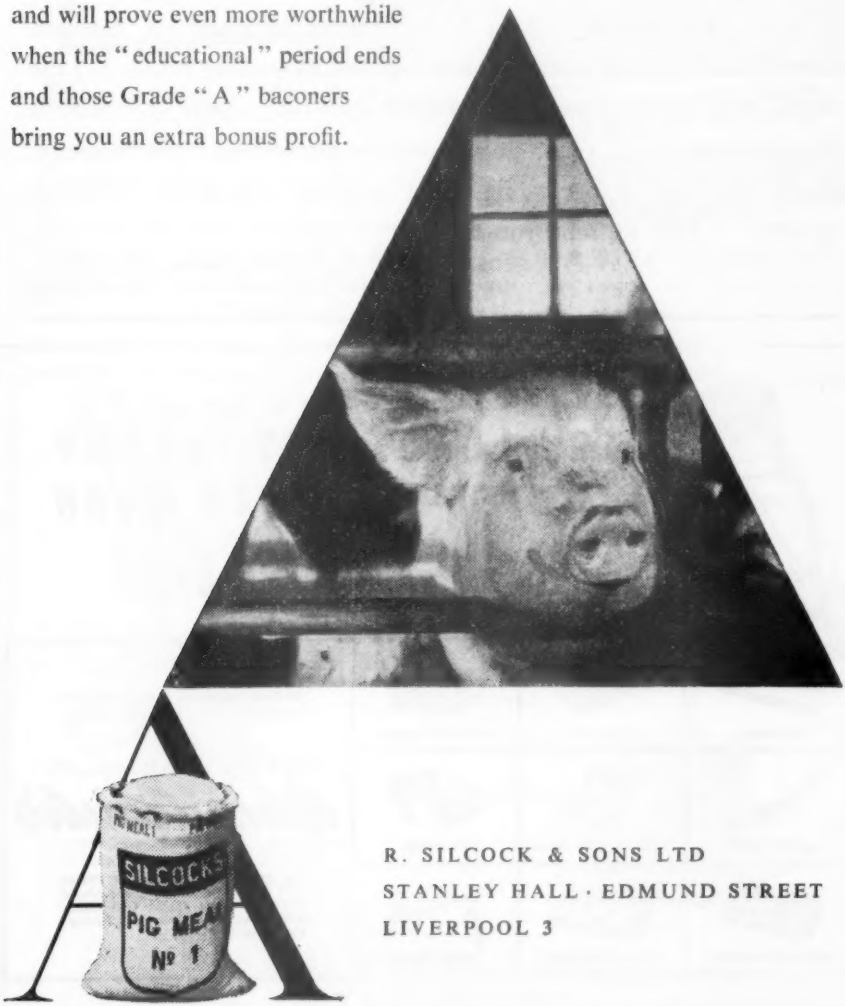

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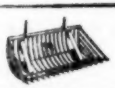
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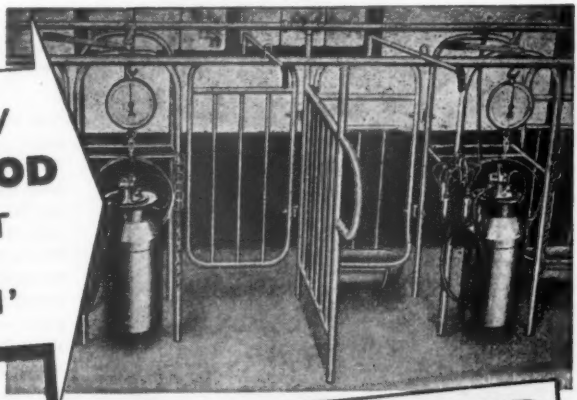

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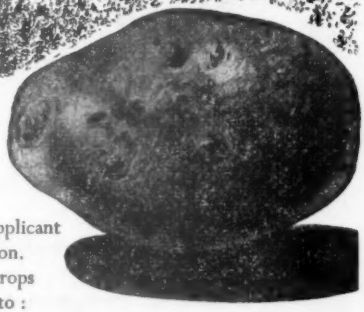

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